amateur radio

DECEMBER, 1973

- TWO METRE TRANSVERTER
- VERTICAL AERIAL — NO GROUNDPLANE
- DIPLEXER FOR THE DISCONE
- DISCONE ANTENNA MEASUREMENTS
- LAS BALSAS
- NATIONAL FIELD DAY RULES

JOURNAL OF THE WIRELESS INSTITUTE OF AUSTRALIA

GRID DIP METER — Model TE-15

SPECIFICATION

Freq. Range: 440kHz-280MHz in 6 Coils
A Coil 0.44—1.3MHz
B Coil 1.3—4.3MHz
C Coil 4.14MHz
D Coil 14.40MHz
F Coil 120-280MHz
Transistor: 3 TR's & 1 Diode
Meter: 500uA Fs.
Battery: 9V (BL-006P)
Dimensions: 180x80x40mm
Weight: 730g

Price $36.50
P & P $1.00

DELUXE AUDIO GENERATOR — Model HE-22D

SPECIFICATION — **Model TE-22D**

Freq. Range: Sin: 20Hz-200kHz
Square: 20Hz-25kHz
Output Voltage: Sine: 7 volt. Square 7 volt
Output Impedance: 1000 ohm
Freq. Accuracy +3% + 2Hz
Distortion: Les than 2%
Tube Complement: 6BM8 12 AT7, 6Z4
Power Source: 105-125, 220-240V AC, 50/60 cps. 19W
With Attenuation Range
4 Ranges—1/1, 1/10, 1/100, 1/1K
Compact-Space Saving.
Printed Circuit for uniform Characteristics.
Low Distortion
Dimensions: 140 x 215 x 170mm
Weight: 2.8kg.

Price $49.50
P & P $2.00

P.M.G. TYPE TELEPHONES—DIAL TYPE EXTENSION

Ericaron Type manufactured by L. M. Ericson. As used by PMG Dept. As new condition. Dial in base. **$19.50** Tested. p&p 75c
Black Phone. Chrome Dial Standard type. Robust construction. **$7.95.** Few only p&p 75c
Plastic Type. Standard PMK type. Manufactured by L. M. Ericson. As new tested. All phones fitted with standard phone plug and socket. **$17.50.** p & p 75c
Double Phone Plug, 6.5mm **75c**
Standard 2 Circuit Phone Plug PMG Type **30c**
PMG Type Counters, 4 digit, 48 Volt operation **50c**
PMG Type Telephone Plug & Socket, round type.
PMG Type Phone Plug & Socket, standard Ericson Type White Plastic **95c per pair**
PMG Type Telephone Extension Bells, 48V **$2.00**
230 Volt RVB Horn Tested **$7.50**

MODEL C1000 — Price $6.95

Is the ideal low cost pocket meter
AC Volts: 10V, 50V, 250V, 1000V (1000 ohm/V)
DC volts: 10V, 50V, 250V, 1000V, (1000 ohm/V)
DC current: 1mA, 100mA
OHMS: 150 ohms.
Decibels: —10db to +22db
Dimensions: 4¾"x3 1/8"x1 1/8" 4¾"x3 1/8"x1 1/8"

200-H — Price $12.50

90° quadrant meter.
Pocket size.
AC/V: 10V, 50V, 100V, 500V, 1000V, (10,000 ohm/V)
DC/V: 5V, 25V, 50V, 250V, 500V, 2500V, (20,000 ohm/V)
DC/A: 50uA, 2.5mA, 250mA
OHM: 60k ohm, 6M ohm.
Capitance: 100pF to .01-uF,
db: —20db to +22db
Audio Output: 10V, 50V, 120V, 1000V AC
Approx size: 4½"x3¼"x1 1/8"

CT-500/P — Price $16.75

Popular medium-size, mirror scale. Overload Protected
AC/V: 10V, 50V, 250V, 500V, 1000V, (10,000 ohm/V)
DC/V: 2.5V, 10V, 50V, 250V, 500V, 5000V, (20,000 ohm/V)
DC/A. 50uA, 5mA, 50mA, 500mA
OHM: 12 ohm, 120 ohm, 1.2 ohm, 12M ohm.
db: —20db to +62db
Approx. size: 5½"x3 5/8"x x1¾"

SOLID STATE WIDEBAND RF SIGNAL GENERATOR

MODEL SG-402

This is an all solid state, wideband RF Signal Generator which produces low impedance low distortion RF signals. It is highly dependable and easy to operate, and is a handy working instrument for service benches and electronic equipment production centres.

SPECIAL FEATURES
1. Generates wide range signals from 100kHz to 30MHz in six frequency ranges.
2. All solid state construction for instant waveforms, compact and lightweight portability.
3. Includes 400Hz signal source for modulation of output signal, which can be modulated by external sources.

Price $99.50. p & p $2.00

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SPECIAL FEATURES
1. Vertical sensitivity of 20 mV/cm, three step attenuation, AC DC operation & wideband frequency response from DC to 1.5MHz.
2. DC vertical and horizontal amplifiers for wide versatility make possible external sweep speeds of less than 1Hz.
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4. Smoked filter glass CRT face and exclusive designed graticule, graduated in dB for clear waveform comparisons.
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Price $150. p & p $2.00

THIS MONTH'S SPECIAL

MAGNAVOX 8-30 Speakers 8" 30 Watt **$13.95**

PEAK 8A7A Speaker, 8" 8 Watt. **$8.95**

MIDLAND MODEL 13-700 TRANSISTOR 2-CHANNEL CALL SIGNAL 1 WATT TRANSCEIVER

SPECIFICATIONS
Circuit: 1 Watt, 2-Channel Solid State Transceiver, 12 Transistors, 1-Diode, 1-Thermistor
Receiving Frequency: 2-Channels available, 27.240MHz. Crystals Factory installed in number one position.
Receiving System: Crystal controlled, super-hetrodyne system with tuned RF stage.
Intermediate Freq. 455 kHz.
Transmit Section: Crystal Controlled Oscillator followed by RF Amplifier.
Modulation System: Push-pull high level class "B"
RF Input Power: 1 Watt.
Frequency Tolerance: +or— 0.005%
Receiver Sensitivity: 1 uV or better at 10 db S/N.
Speaker/Microphone: 2¼" PM Dynamic, 8-ohm
Accessory Jacks: AC, Earphone and Charge.
Power Source: 12V DC (8 x 1.5V "AA" cells)

Price $39.75 each or $79.00 per pair
Optional (Channel 2) 27.880MHz **$5.00 EXTRA**

RF SIGNAL GENERATOR — Model TE-20D

SPECIFICATIONS

Dial has 7 separate band TE-20D covers 120kHz — 500MHz (6 Fundamental Bands & 1 Harmonic Band)
Freq. Accuracy: +or—2%
Audio Output: to 8 volt
Internal Modulate: 400Hz approx.
Tube: 12BH7A, 6AR5
Power Source: 105-125V, 220-240V AC 50/60Hz. 12 watts
TE-20D employs a Xtal socket and can be used as below.
a.—Self-Calibration
b.—Marker Generator
Small size-Space Saving.
Printed Circuit for a uniform characteristics.
Dimensions: 140v215x170mm
Weight: 2.8kg.

Price $47.00. p & p $2.00

DX150B REALISTIC with SEPARATE SPEAKER

The popular REALISTIC DX150B which has gone from strength to strength with amateurs, shortwave and broadcast listeners alike, now has a further improvement, A SEPARATE MATCHING SPEAKER included.
The DX150B gives long-range, world-wide realistic reception on 4 bands, including Broadcast Fully transistorised-all solid state-no warm-up delays, the DX150B will run on dry cells if current fails or is not available, will operate from a car's cigarette lighter or any 12V DC service. A 240V AC power supply is also built in. Over 30 semi-conductors-product detector for SSB/CW, plus fast and slow AVC-variable pitch BFO-illuminated electrical bandspread, fully calibrated for amateur bands-cascade RF stage-ANL for RF and AF-zener stabilised-OTL audio-illuminated "S" meter.

Price $229.00
P & P $2.00

15" PIONEER GUITAR SPEAKER

15in Pioneer Low Frequency Speaker, Imp. 8 ohms. Power, 30 Watts, R.M.S. Designed especially for use with Bass Guitar or Electric Organ. Also ideal for Stereo Woofer Speaker.

Price $29.50

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amateur radio

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FRONT COVER :

H.R.H Prince Phillip operates the Townsville Amateur Radio Club's Station VK4TC and talks to the crew of the Las Balsas raft expedition. On the Duke's right is the Mayor of Townsville, Alderman Max Hooper.

QSP

Amateur Satellite Service

IARU Headquarters in a circular to all member societies advises that the FCC in the U.S.A. has issued a Notice of Inquiry seeking comments and suggestions from interested parties **in the U.S.A.** as to what rules should apply to the Amateur Satellite Service **IN SO FAR AS THE U.S.A. IS CONCERNED.**

It appears that hitherto the regulation of communications functions has been on an ad hoc basis. Now that longer life Oscars are in operation or are being planned, the FCC believes the time is ripe to regularise operations through satellites **IN SO FAR AS U.S.A. USERS ARE CONCERNED.**

The ARRL will be formally sending submissions to the FCC as the proper channel of communications between the amateur service and the FCC **IN SO FAR AS U.S.A. REGULATIONS ARE CONCERNED.**

The FCC have called for submissions to be made by **7th January next.** IARU Headquarters believes that comments from member societies will be useful because of the international aspects of the Amateur Satellite Service. The Executive of the WIA are in process of co-ordinating any views. Views which it is hoped will be sent in by VK amateurs. Views and comments which have already been requested from the relative technical Committees including Project Australis.

Why is the Executive taking this action?

Firstly to give IARU the benefit of Australian views on the subject. Secondly to crystallise our own thinking on the subject if the PMG's Department decide to draft Australian rules. Thirdly to determine what rules and regulations are desirable assuming that any are indeed required at all.

We have authority for Limited Licensees to use the Oscar satellite under their own call signs when the downlink is in the 10 metre band.

No separate licence is required to operate through a Satellite.

There are no planned uplinks on 10 metres to Satellites so our future 'Novices' could not operate through a Satellite even if the WIA pressures to allow Novices a segment on 10 metres proves successful.

Command stations, which are under the control of the Project Australis Group do not require separate licences and are authorised for higher power for command purposes.

The Group's business may be conducted over the air with Amsat stations as a special privilege relating to Oscar Satellites.

A special 2m to 70cm experimental repeater was licensed for user familiarisation but is no longer required.

Our own authorities have also acted on an ad hoc basis. Whether or not any special rules or regulations will be deemed necessary remains to be seen.

Because the IARU needs assistance in this field it will be given. The information now collected could be useful for ourselves at a future date but the Executive hopes it will not be required because the amateur service and, ipso facto, the Amateur Satellite Service, should be largely self-regulatory.

If any member does have any views on the subject he should submit them through his Division or through one of the three Executive Committees concerned with the usage of the higher frequencies.

David A. Wardlaw
VK3ADW
President.

Mellish Reef Dx-pedition

Recognition of VK9JW for the ARRL DXCC Award was suspended by the ARRL following certain disputes.

The WIA supplied on 29th June 1973 the information sought of it by the ARRL.

The recognition of VK9JW for its DXCC is a matter for ARRL not the WIA. It is believed that the ARRL has referred the question to its DX Advisory Committee and is still to determine the question.

a two metre transverter

MIKE TRICKETT, VK3ASQ
8 Matlock Street, Herne Hill, Geelong, 3220.

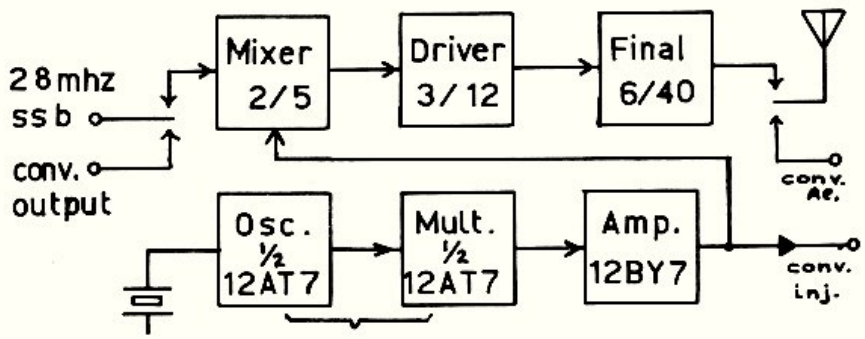
Having seen the light, and turned to SSB operation on six metres several years ago, I decided to make the shift to SSB on the 144 MHz band as well. The resulting transverter was designed to operate in conjunction with an FT200 transceiver; however there should be no difficulty in adapting it to operate with another transceiver or transmitter. The FT200 lends itself nicely to transverter operation, the accessory socket on the back making available all supply voltages required plus relay terminals. It also has provision for removing the final stage heater supply, while still giving a low level output (about 1W PEP) from the driver stage to a phono type socket on the back. With these facilities available this transverter resulted.

The 28 MHz band was used as the IF because it has two main things in its favour. 28 to 30 MHz coverage giving 2 MHz tuning range, and the problem of images is minimised as the image frequency is 56 MHz away. Not much of a consideration at 6 or 2 metres, but a forthcoming project is a 432 MHz transverter and for convenience it was decided to use 28 MHz for all transverter IF's.

OPERATION

From the block diagram, it can be seen the transverter consists of 3 main sections; a crystal oscillator and multiplier chain producing RF at 116 MHz at about 1 watt, the transmitter section, and the receiver section. The oscillator section is straight forward, consisting of a crystal oscillator at 29 MHz, followed by two doubler stages producing 116 MHz output. The output tuned circuit of the oscillator chain couples to two points; the transmitting mixer, and the receiving mixer in the converter. The mixer V1 is the heart of the unit, and the section where the most experimentation was done. Several configurations and tube types were tried, but the QQE02-5 in the configuration shown here was considered to produce the best results, consistent with gain, linearity and rejection of unwanted frequencies. It will be seen that the 28MHz SSB signal is applied to the grids in push-pull and the 116MHz is applied to the center tap on the 28MHz coil, that is in parallel to each grid. The plate circuit is tuned to 144MHz and is in push-pull. This configuration produces cancellation of the 116 MHz component in the plate circuit.

V2 is simply an amplifying stage which brings the level up to that sufficient to drive the final.

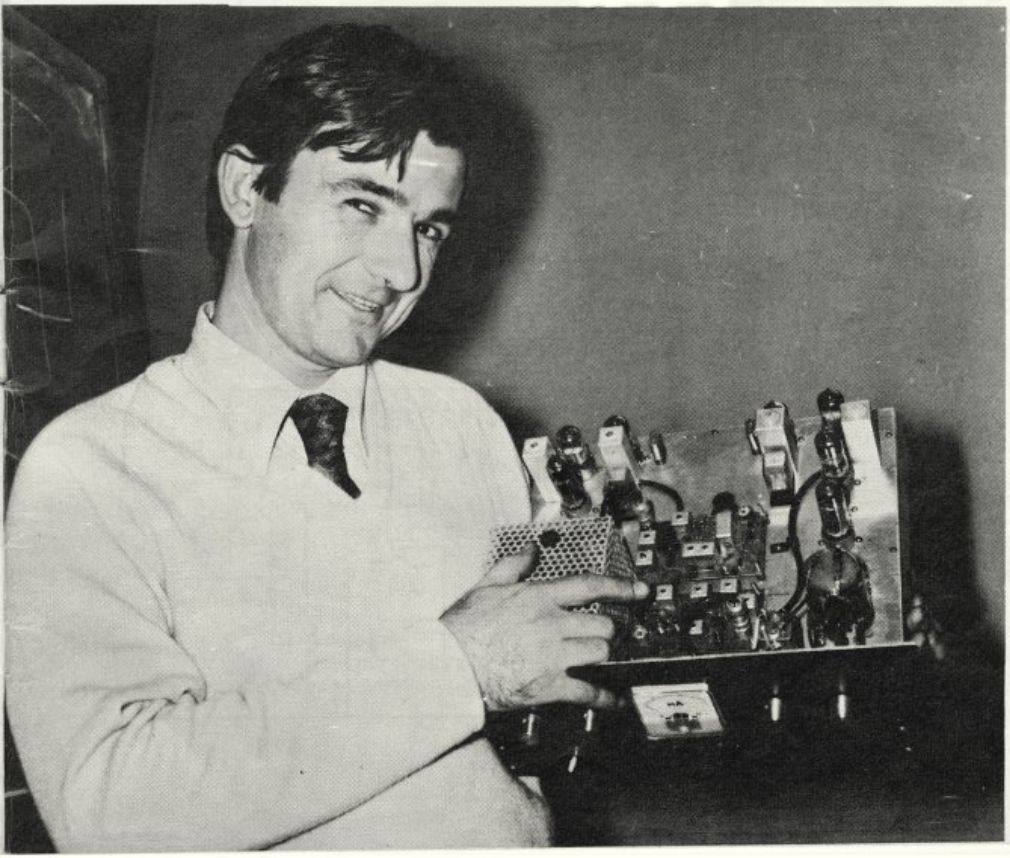


BLOCK DIAGRAM OF TRANSVERTER

V3, a QQE06-40 PA, is operated in AB2 with metering in the cathode. These components are not labelled as any suitable meter will do the job with the appropriate shunt.

The bias arrangement utilises a voltage divider circuit for each stage; the bottom of each stage leg goes to a common point and is connected to earth via a contact on the TX-RX relay. In the receive position the full bias voltage of -100 is applied to the three stages cutting them off. The final has a zener diode in its bias supply to stabilise the bias at this point. In an earlier design, trouble was experienced with the negative voltage increasing at this point as the drive was increased, thus causing a flattening off of the plate current at about 120 mA. Then, no matter how much the drive was increased, no more plate current would result. This was traced to the final grid drawing current and developing additional negative voltage, thereby producing an undesirable ALC effect.

Mike VK3ASQ displaying the completed 6 and 2 metre transverter at a recent VK3 VHF Group meeting.



CONSTRUCTION

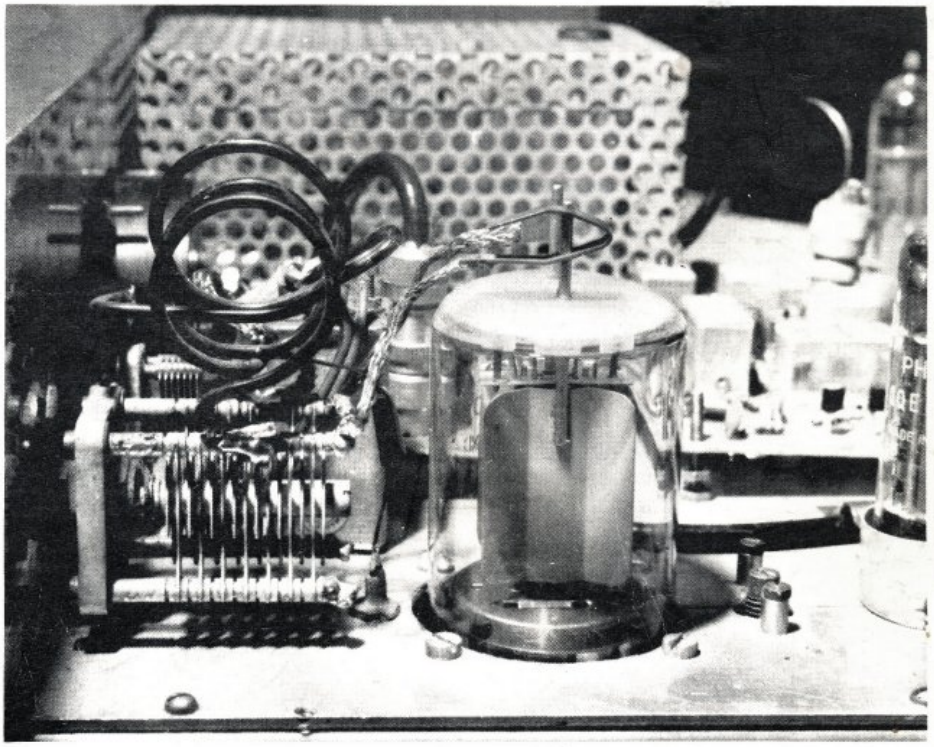
The unit was constructed on an aluminium chassis 12"x11½"x2½" using the layout as shown. On the vacant left hand side a 6 metre unit was constructed thereby providing 6 & 2 metre facilities. (the 6 metre unit will be the subject of a later article). The heaters were wired for 12 volts as the FT200 has a 12 volt heater line, usual VHF construction practices were followed, and a tin plate shield was soldered across the socket of V2 to shield input and output.

ALIGNMENT

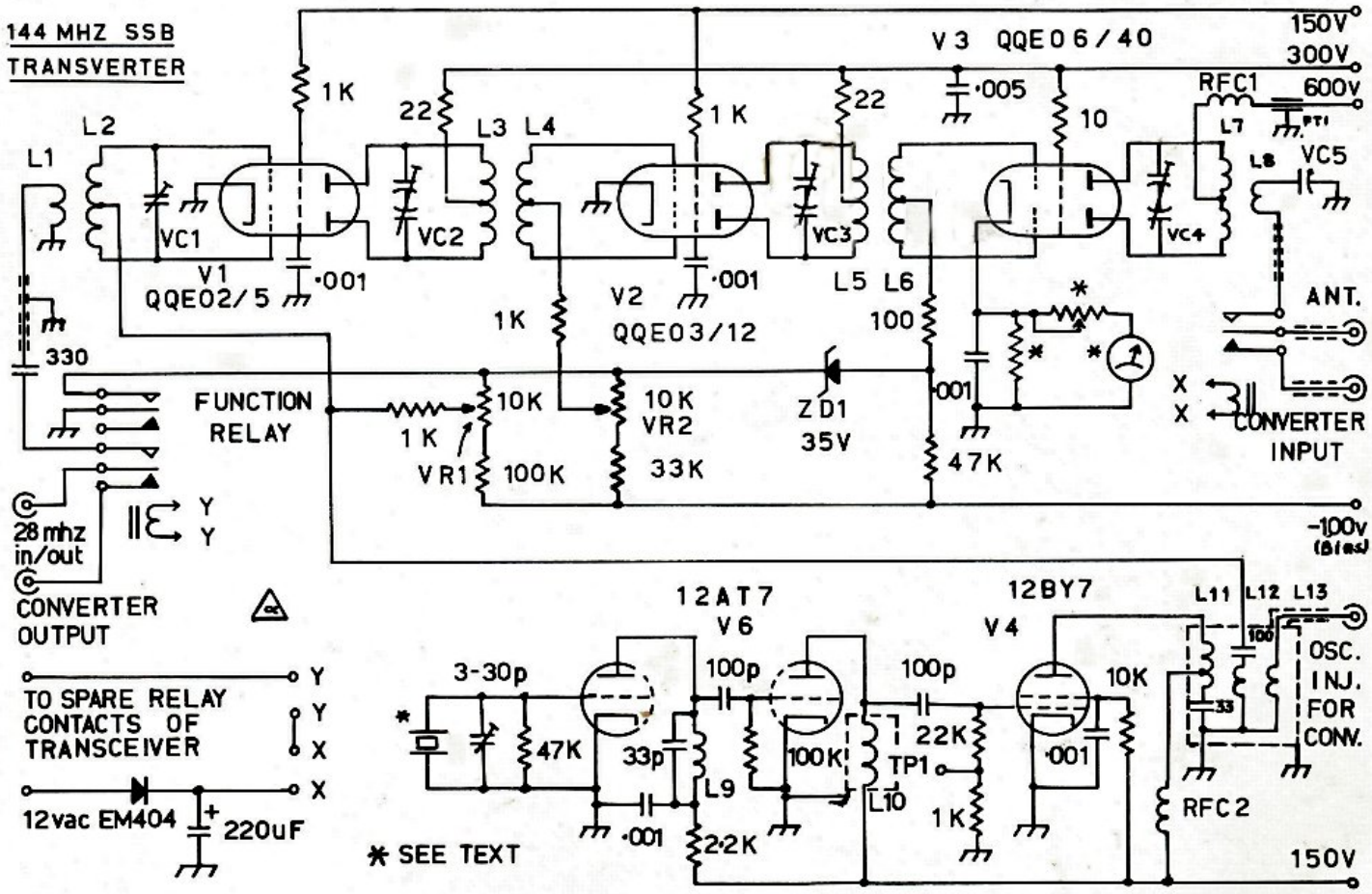
The oscillator section is first checked out. Plug in the 12AT7 and 12BY7 with a multimeter on the cold end of L9 and adjust L9 slug for an increase in voltage. A point will be reached where oscillation ceases and the voltage falls sharply; the slug should be set to a point just before this happens. The crystal should be pulled in and out a few times to ensure stable and reliable oscillation. L10 is tuned for maximum negative voltage at TP1, about 1 volt. A diode probe is connected to the center of the co-ax. going to the receive converter and L11 is adjusted for maximum.

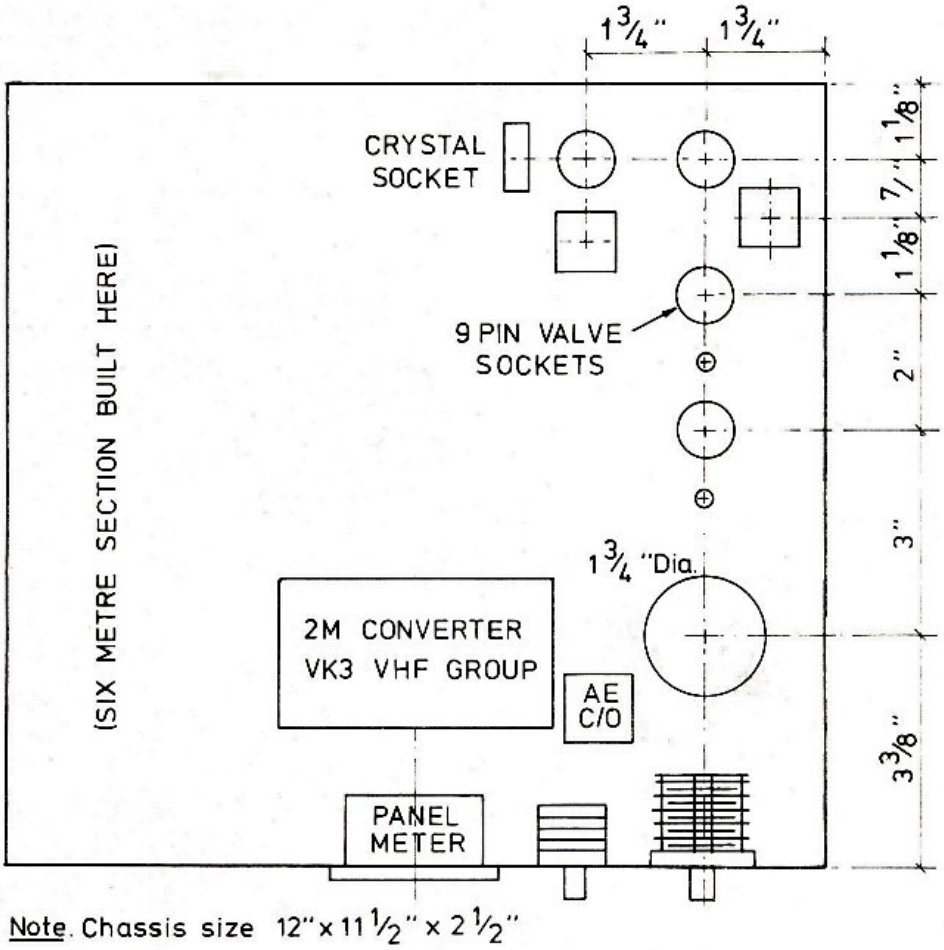
V1, 2, and 3 are now plugged in and the transceiver switched to transmit. The PA should be drawing about 60 mA and its bias should measure -35 volts. VR1 and VR2 are set for -4 and -20 volts on the taps, respectively.

With the transceiver in tune position, it should be adjusted for maximum output at 28 MHz. Now with an absorption wavemeter near L2 adjust VC2 for maximum reading at 28 MHz; with the wavemeter at 144 and near L3, VC2 is adjusted for maximum; with the wavemeter near L5, VC3 is adjusted for maximum. With a wattmeter connected to the output of VC4, VC5 and the coupling and spacing of L7 and L8 should be adjusted for maximum RF output. Re-peak all adjustments for maximum power output at 144 MHz. With full carrier or tone the output should exceed 50 watts RMS. PA cathode current should peak at between 250 and 300 mA on speech peaks.



A close-up of the final tube and tank circuit of the VK3ASQ two metre SSB transverter.





Note. Chassis size 12" x 11 1/2" x 2 1/2"

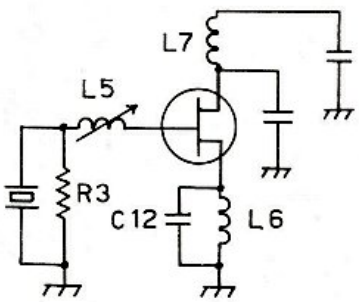
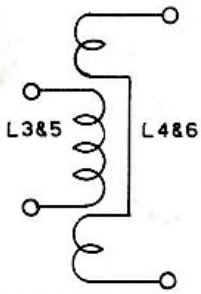


FIGURE 1 - ORIGINAL



L3 & L5 Each 4 t 20 SWG 1/2" d. spaced by 1 wire d.
L4 & L6 Each 2 x 2 t 20 SWG 1/2" diam.

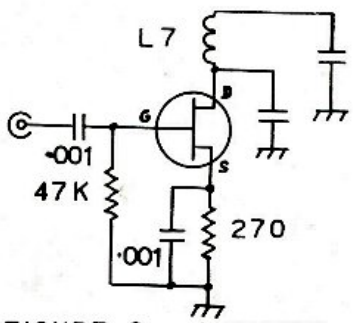
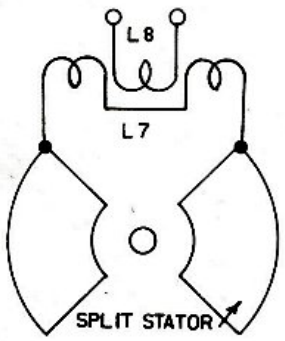


FIGURE 2 - MODIFIED



COIL DETAILS

RECEIVING SECTION

The receiving section uses a WIA VK3 VHF group 2 metre converter, modified for external oscillator injection.

While this is not strictly necessary, it is most desirable as it ensures that the transverter actually transmits and receives on the same frequency. It also saves the cost of one crystal, and gives the converter a little more oscillator injection, producing a slight improvement in performance. Fig 1 gives the original circuit, while Fig 2 shows the simple modification required.

The L6 coil form is replaced with a 270 ohm resistor in parallel with a 1000 pF ceramic capacitor, utilising the holes in the p-c board where the coil would go. The gate is added in place of L5, again using holes in the board. The co-ax, which comes from L11 comes through the side of the L11 can, across the chassis, and is soldered to the bottom of the converter, which is mounted on stand-offs above the main chassis.

The trimmer across the crystal should be adjusted to bring the transverter onto frequency. If a counter is not available, this can be done by firstly calibrating the transceiver at 28 MHz, then with the transceiver in the receive mode locate the 100 KHz calibrator harmonic at 144 MHz. It may be quite weak and it may be necessary to hang a wire near the 100 KHz oscillator with the other end in the converter input. Adjust the trimmer until the 28 MHz harmonic and the 144 MHz harmonic produce a zero beat (RX in AM position).

A possible improvement to the unit can be had by using a 38.666 MHz crystal in the oscillator and multiplying by 3 to produce 116 MHz. This will do away with a small problem encountered in the unit, that is 29 MHz x 4=116 MHz, but 29 MHz x 5 = 145 MHz. Very little of this fifth harmonic content actually gets to the antenna, mainly due to the cancellation in the mixer, but nevertheless it's a problem which can be eliminated before it starts by utilising a different crystal.

If a separate transmitter-receiver combination is to be used, the 28 MHz in and out relay can be omitted and two cables used, one for in and one for out. This can also be done with the FT200 if required, by feeding the low level output into the transmitting mixer, and the receiver mixer output into the normal antenna socket, thereby utilising the internal antenna change-over relay in the FT200. ●

USA Repeaters

It appears that repeaters in the 2m band are a big issue in the USA arising out of FCC Docket 18803 – briefly mentioned in QSP, Jan '73 A.R. – as reported by Wayne Green in '73' Magazine for July '73 and elsewhere. As if the "apparently asinine" FCC Regulations were insufficient to spark off vociferous complaints according to one report, yet another report mentioned the chief of the FCC division responsible for amateur operations as saying that in his view amateur radio was no longer justifying itself – appliance operators seemed to be in the overwhelming majority. One might be forgiven in asking if these are straws in the wind for the 1978 ITU WRA Conference.

SIDEBAND ELECTRONICS ENGINEERING

144-148MHz TWO METRE OPERATION EQUIPMENT

CLEGG FM 27-B U S A 25 Watt output transceivers, continuous coverage, independent receiver & transmitter frequency controls, see MAY 73 QST for full report. 12-13V DC operation, with P T T microphone, if enough interest shown to place a large order, soon available for **$350**—subject to by-law import privileges.

KEN PRODUCTS KP-202 with crystals for 4 channels, new repeater 1 and 4 frequencies available, full 2 Watt output, hand-held **$150.00**

KEN chargers for NICAD batteries, **$20.00.** NICAD Batteries **$15.00** for ten.

BELCOM LINER 2 20 Watt P E P solid state S S B transceivers, 12V DC **$330.00.**

SWAN TV-2C 144 transverters, 28MHz drive, 144MHz 240 Watt P E P output on S S B, 180W FM or AM/CW, receiver convertor with 3 F E T's. **$430.00.**

SWAN VHF-150 144MHz linear amplifier, built-in 240V AC power supply, optional Class C or Class B operation, 150W carrier input. **$375.00.**

YAGI ANTENNAS, 9 element 10 ft boom, with gamma-match coax feeding **$30.00**
Still attempting to procure 12V DC operation solid state 20 to 50 Watt automatic operation amplifiers.

MIDLAND PRODUCTS. Model 13-869 5W, 23 channel C B 27MHz 12V DC transceivers, all channels crystals provided, P T T mike **$90.00.**

Model 13-856 5 Watt AM 27-880 operation for marine use 12V DC, P T T mike, etc., included **$75.00.**

Model 13-700S one watt 2-channel walkie-talkies **$40.00**

Model NC-310 1 watt 3-channel de luxe walkie- talkie **$50.00**

Crystals for various 27 & 28MHz channels, per pair **$3.00**

S W R Meters, 52 ohm, twin-meter type **$16.00.**

S W R Meters, single meter type, also F S Meter **$12.00**

P T T hand-held dynamic 50k ohm microphones **$10.00**

BARLOW-WADLEY XCR-30 Mark II continuous coverage 500kHz to 30MHz crystal receivers, perfect A M & S S B reception. **$225.00.**

ANTENNA ROTATORS CDR AR-22-R **$40.00.**

CDR HAM-m **$130.00**

HY-GAIN 400 extra heavy duty roto-brake rotators. **$185.00**

(All with control indicator units)

HY-GAIN ANTENNAS 14 AVQ/WB 10 to 40m verticals no guys 19' tall **$45.00**

18 AVT/WB 10 to 80m verticals, no guys 23' tall **$65.00**

TH3JR 10/15/20m junior 3el Yagi 12' boom 20 lbs **$100.00**

TH3Mk3 10/15/20m senior 3el Yagi 14' boom 1kW **$145.00**

TH6DXX 10/15/20m senior 6el Yagi 24' boom **$175.00**

204-BA 20m 4el full size Yagi, 26' boom **$155.00**

Mobile whip 108MHz up with magnetic hold base and 18 ft RG-58U cable and coax plug **$18.00**

Same mobile whip but without magnetic base, with standard base and 12 ft coax cable and plug **$9.00**

BN-86 baluns **$18.00.** Locally produced balun **$15.00**

POWER SUPPLIES, 240V AC to 12V DC 3 to 3.5 amp, regulated output overload protected **$26.00**

POWER OUTPUT METERS
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a Diplexer for the Discone

Tom Moffat VK3AQV
63 Doncaster East Road, Mitcham, 3132.

This article is a follow-up to the one on the DISCONE broad-band VHF antenna, published in *AR of April 1973*. The antenna can be used on all VHF bands from 52 to 432 MHz, but its biggest problem, as stated in the earlier article, was that "you can't listen on six while talking on two". After several months of frustration on changing co-ax connectors over every few minutes to try to keep an ear on both bands, it was decided to make a concentrated effort to use the Discone on both 6 and 2 metres at the same time.

It was found that it would receive well on both bands by feeding the six and two metre receivers from the one lead-in with a 'T' connector. But accidently keying one transmitter surely would have caused embarrassment in the front end of the other receiver.

The first step was to design some kind of filtering system that would pass all the 6 metre energy to the Discone, and block it from the 2 metre receiver.

All that was hoped for at that stage was to prevent the blowing up of front ends when a transmitter was keyed.

As for cross-band duplex operation (talking on two while listening on six), everyone who heard of the idea said, "It'll never work, 6 metre signals will block the 2 metre receiver, and vice versa".

But you can never be sure of these things until you try them. That is what amateur radio is all about.

DEVELOPMENT:

The Diplexer, Model One, consisted of a series of pass and reject filters made of RG58 co-ax, and arranged in the configuration shown in the block diagram, Fig 1.

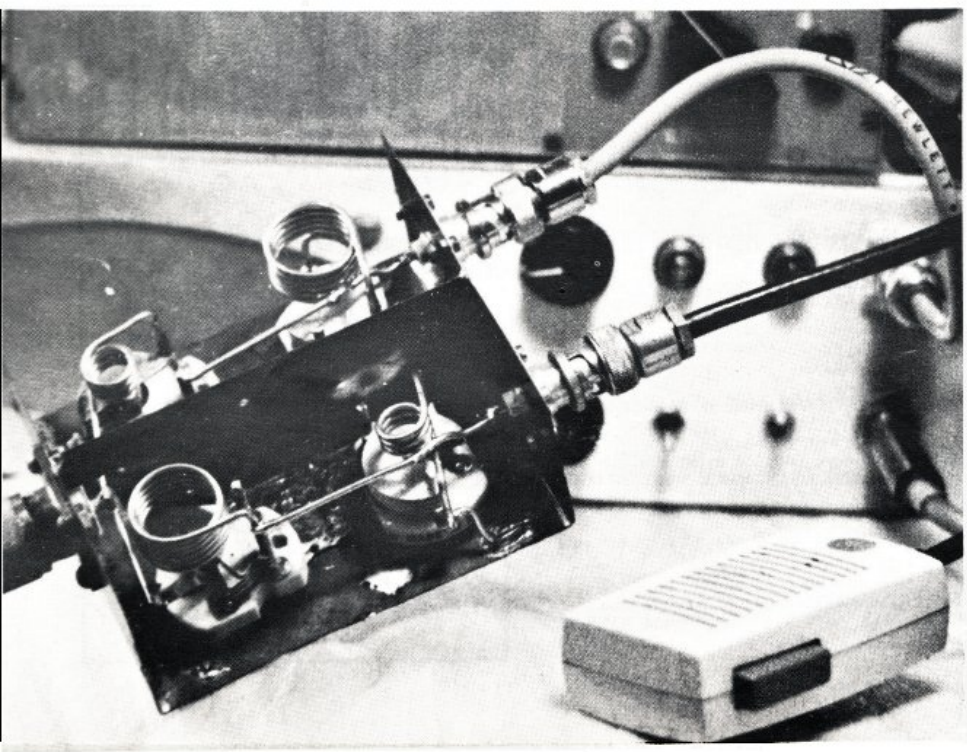
Each was a shorted stub, a quarter wavelength long, to present a very high impedence at the design frequency.

The 'pass' filters were connected across the line, to short everything but the resonant frequency to earth, while the 'reject' filters were connected in series with the line to present an open circuit at their resonant frequency (the unwanted frequency) and pass everything else with little attenuation.

In other words, a 6 metre signal fed into the 6 metre port would pass the 6 metre parallel stub as if it was not there, go **through** the 2 metre series stub (resonant at 2 metres only), and on to the Discone and the 6 metre series stub. The 6 metre signal hitting the 6 metre series stub would see it as an open circuit, so all the energy would have to go to the Discone.

If any did manage to sneak through the 6 metre series stub, it would be shorted to earth when it hit the 2 metre parallel stub, before it could damage the 2 metre receiver.

The first part of this scheme worked quite well. Fifteen watts fed into the 6 metre port resulted in about 14½ watts at the Discone port, with only 100 milliwatts or so appearing at the 2 metre port and the rest probably dissipated in the dialectric of the stubs. At this stage it was possible to listen to a fairly strong 2 metre signal while the 6 metre transmitter was keyed, although commercial services came through the 2 metre receiver if no other signal was present.



Things were not so encouraging in the other direction. Fifteen watts of 2 metre energy into the 2 metre port resulted in about 3 watts at the Discone port, about 30 milliwatts at the 6 metre port, and an SWR at the 2 metre port of about 5 to 1. The reason for this became obvious after some concentrated thinking. A 6 metre shorted ¼ wave stub is very close to a ¾ wave stub on 2 metres, so 2 metre energy was also seeing a near open circuit.

So much for that idea.

Diplexer Model 2 was made up in a similar way but with RG8 cable instead of RG58.

It was hoped that the lower loss cable would provide higher Q stubs.

Since three times the 6 metre frequency, 52.525MHz, is 11.5MHz away from the 2 metre design frequency of 146MHz it was hoped the higher Q would provide some discrimination against the three-quarter wavelength effect.

But it was not much better, and the tuned stub idea was abandoned. In Diplexer Model 3 it was decided to try coils and capacitors in the same configuration as the stubs.

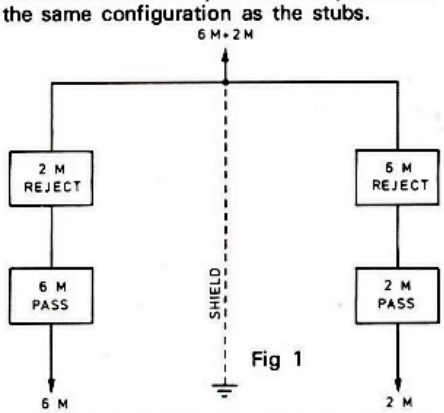


Fig 1

First tests on this circuit showed that the series rejection filters were good and sharp, and did their job well. And there was no more 2 metre reaction to 6 metre tuned circuits.

As for the parallel pass filters, they were not much good. Tuning them had little effect, and they showed a high SWR back to their sources. Obviously their Q was way too low.

But when they were tapped down from the hot end, the tuning became much sharper, and the input SWR fell dramatically.

Model 3 was obviously going to be a winner.

After a bit of adjustment of the taps, the SWR dropped to 1 to 1 at the 2 metre port and 1.1 to 1 at the 6 metre port, and the power through to the Discone was pretty much the same as what went in.

As far as 6 metre energy at the 2 metre port, and 2 metre energy at the 6 metre port, both of these were too low to see even on a sensitive power meter.

And on the air, it was impossible to tell the Diplexer was in circuit. Both rigs worked as if they had separate antennas, well spaced apart.

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300mA, 12A
OHM: 2k ohm, 200k ohm. 20M ohm, 200M ohm
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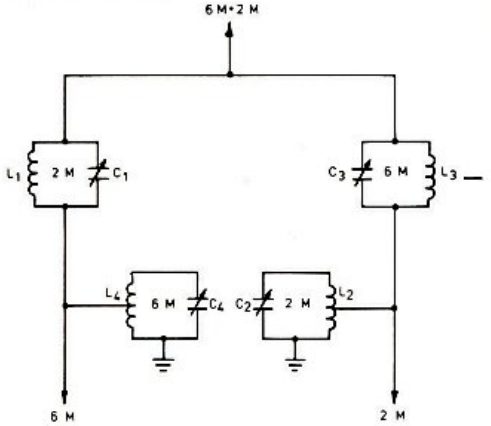
CONSTRUCTION:

The final version of the Diplexer was built in a home-made brass box, with a brass shield separating the 6 and 2 metre sections.

Layout is exactly as shown in the block diagram, with the four tuning capacitors spaced evenly around the box. The coils are mounted directly above the capacitors, and the appropriate co-ax connectors are mounted in the ends. The box in use measures about 3 by 4 inches, but this was found to be a bit small. With the cover on the coils are too close to the sides, and their Q suffers.

The only way it will work properly is with the cover removed, and that is the way it is used to this day.



L_1 - 3 turns 16B&S. $\frac{5}{16}$" I.D.
L_2 - same as L_1, tap 1 turn from earth end.
L_3 - $5\frac{1}{2}$ turns 16B&S, $\frac{5}{8}$" I.D.
L_4 - same as L_3, tap $1\frac{1}{2}$ turns from earth end.
C_1, C_2, C_3, C_4 - Approx. 5-50pF air trimmer.

The tuning capacitors are not critical . . . we used some that happened to be on hand.

Anything should work as long as they will resonate with the coils as specified, but make sure they have good ceramic insulation.

Remember, high Q is the secret to success in this circuit.

ADJUSTMENT:

Tuning the Diplexer is fairly simple. The first step is to terminate the Discone port in 50 ohms. Then feed a 2 metre signal into the 2 metre port and adjust C2 for minimum SWR with the detector connected between the transmitter and the 2 metre port. Next do the same with a 6 metre transmitter and the 6 metre port, adjusting C4.

Now feed 6 metres into the 6 metre port, leave the Discone port terminated, and connect a sensitive power meter to the 2 metre port. Adjust C3 for minimum indication.

Finally feed 2 metres into the 2 metre port, connect the power meter to the 6 metre port, and again go for minimum power, this time adjusting C1.

As the adjustments interact to a slight degree, they should all now be repeated, but this time with the Discone connected to the Discone port through the cable length normally used with it.

After the second run through you should not be able to measure any power from the 6 to 2 port, or the 2 to 6 port, and the input SWR for both should be very close to 1 to 1. If it's not, a slight adjustment of the tap on the offending L2 or L4 should put things right.

As a "final-final" adjustment, for greatest 6 to 2 and 2 to 6 loss, terminate the Discone port in 50 ohms once again, and connect the Discone itself to the 2 metre port.

Now connect the 2 metre receiver to the 6 metre port and listen for a strong signal.

It will not sound strong going through the Diplexer in this way as it will probably be attenuated by at least 60dB. Once you hear something adjust C1 for minimum signal. You will probably be able to null it out completely by careful adjustment of C1.

This adjustment should be done sitting down, with both elbows on the table and both hands on the screwdriver. It is a very touchy one and the smallest rotation of the screw will take the test signal from full quieting to virtual absence.

Let it be stressed that a **STRONG** signal will be required for this test, as the loss when properly adjusted will be very high. Once the 2 metre reject filter has had this final touch up, you can switch things around and do the same on the 6 metre reject filter.

Once these adjustments are made, check and touch up if necessary the SWR readings into the 6 and 2 metre ports, with the Discone connected to the Discone port. They should require only a minor adjustment if any, and will not affect the tricky return loss adjustments just made.

PERFORMANCE:

Now you should be able to connect the Diplexer into the system permanently.

If it is working as it should, keying one transmitter should have no effect on the other receiver. If it does, connect the transmitter to the Discone direct, and terminate the other receiver in 50 Ohms. Chances are any noises you hear will occur just the same, without the Diplexer even being in circuit, due to some small spurious coming out of the transmitter.

A COUPLE OF FINAL POINTS:

You may find your 6 metre rig works better with the Diplexer than without it.

This is because the 50MHz Discone shows some reactance at the low end of its frequency range, causing an SWR of about 2½ to 1 with a 52.525 signal.

The Diplexer seems to work as a sort of antenna tuner, improving the match between the transmitter and antenna at this frequency. The Discone article also stated that a band pass or low pass filter should be used between the transmitter and antenna, to prevent the radiation of harmonics.

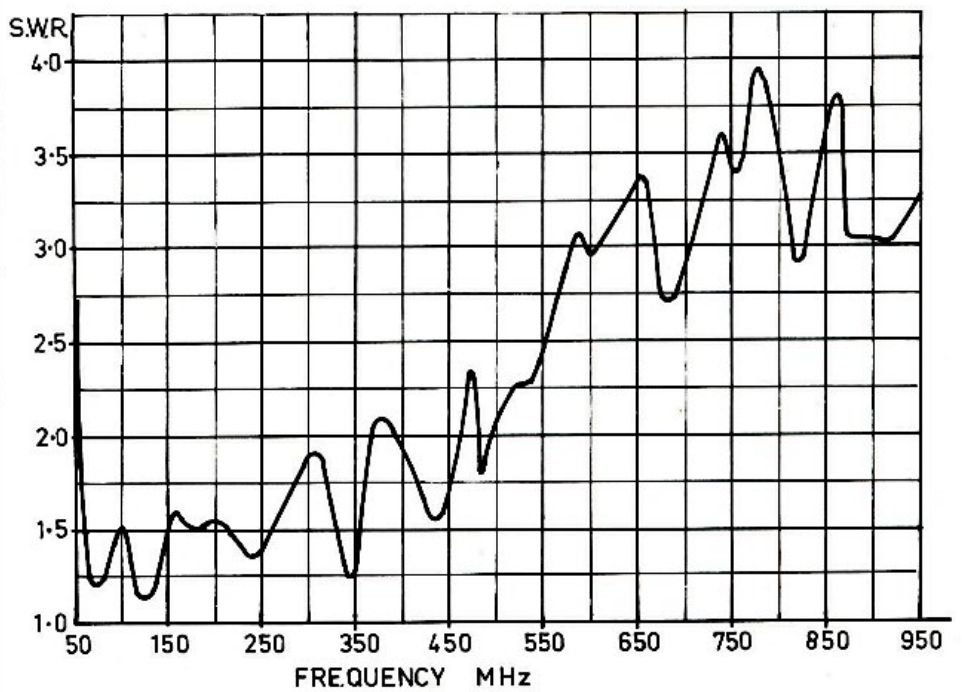
The Diplexer serves very nicely as a band pass filter for both 2 and 6, as the parallel filters tend to block anything other than the desired frequency.

It seems likely that this design could be expanded to take in 432MHz, by adding the appropriate pass and reject tuned circuits. This would bring the total to nine, but it should work after a bit of development time.

How about someone trying it? ●

discone antenna measurements

Ross Dannecker VK4ZFD/T
Kings College, University of Queensland, 4067.



ABOVE—A graph showing the comprehensive SWR measurements performed on a DISCONE antenna constructed from the article in April, 1973, AR. ●

vertical aerial needs no groundplane

BRIAN RICHARDSON VK4CCR
20 Peacock Street, Leichhardt, Q. 4305.

Mobile operation does not necessitate drilling the roof of the car to mount the usual quarter-or ⅝-wave whip. Here's how to avoid the problem and still get better than quarter-wave performance.

Of the various types of vertical antennas, so popular among VHF mobile operators, nearly all suffer from one big disadvantage; they require a good earth or counterpoise to decouple the RF current from the outer conductor of the coax feeder. Achieving this end involves drilling a disfiguring hole in the roof of the car, or carrying a bulky counterpoise with the portable station. There is, however, another version of the vertical, by no means a new idea, but one that is largely neglected today. This is the half-wave vertical, and it will provide 2dB of gain over the quarter-wave whip, without the need for a ground-plane. The end fed half-wave is fed at the point of minimum RF current, and so for practical purposes eliminates the need to decouple the coax outer conductor. It does however require a suitable matching network to match the low impedance coax to the high impedance antenna, and this is achieved by using a parallel tuned circuit to feed the antenna, and tapping the coax into the inductor. The inductor is a large diameter single turn, used to minimise coupling between the antenna and itself, the resonating capacitor is a ceramic variable. See Fig 1.

CONSTRUCTION

The antenna I constructed was a two-metre version of the half-wave, and is shown in the accompanying diagrams. It used a 41 inch length of thin fibreglass fishing rod stock. A piece of coax braid was slid over the top of the rod for a length of 38¼ inches. The 2¼ inch diameter inductor was made up as in Fig 1, from ¼ inch wide copper strap, and soldered to the bottom of the braid. There is no reason why heavy copper wire such as 10 gauge should not be used here. The tuning capacitor, a tubular ceramic variable in my case, was soldered in parallel with the coil, and the outer conductor of the 50 ohm coax soldered to the bottom end of the coil. Determining the correct point for attaching the centre conductor is best done by the trial and error method, varying the tapping point on the coil for best SWR.

ADJUSTMENT

After the antenna is constructed attach the coax centre conductor initially about two inches from the earthy end of the coil, connect a SWR bridge into the feeder and feed a small amount of power into the antenna. Adjust the variable capacitor for best SWR, then move the position of the tapping point on the coil and re-measure the SWR after trimming the capacitor again. You will find very little interaction between these two adjustments and a good SWR can be obtained with a few minutes work. The antenna should be mounted several feet away from any large metal objects while carrying out these adjustments.

INSTALLATION

Once properly adjusted the antenna may be mounted on a wooden pole, clipped to the guttering of a car, or nearly anywhere, and the SWR will show only the slightest change. If a significant change in SWR occurs when a good earth is connected, then this indicates that there is coupling between the coax outer conductor and the antenna field. This is best remedied by running the feeder away at right angles to the antenna, or by looping the coax through a ferrite toroid about nine inches away from the antenna. See Fig 2. A suitable toroid would be the Q2 toroid advertised by the WIA disposals committee.

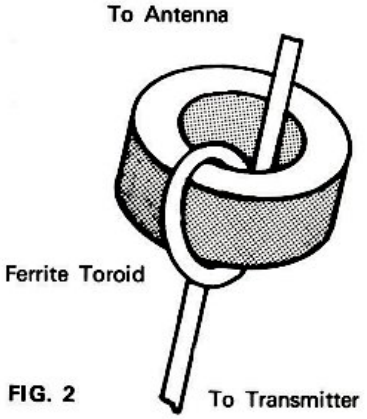


FIG. 2

PERFORMANCE

I have made tests, comparing the quarter-wave whip mounted in the centre of the car roof, and the half-wave attached to a gutter mount. In all situations the half-wave gave considerably better performance than the quarter-wave, sometimes providing a solid signal where the short whip only picked up a weak fluttery signal. Tests made over about 10 miles between two hills, and using the receiver limiter current as an indication, gave results which indicated that the half-wave had slightly more than 2dB gain over the quarter-wave vertical.

The details given have only covered a 2-metre whip, but the same principles apply to any frequency. For example on 20 metres the coil would be about 25 inches diameter, of ¼ inch diameter tubing, tuning with a capacitor of 70 to 100pF. ●

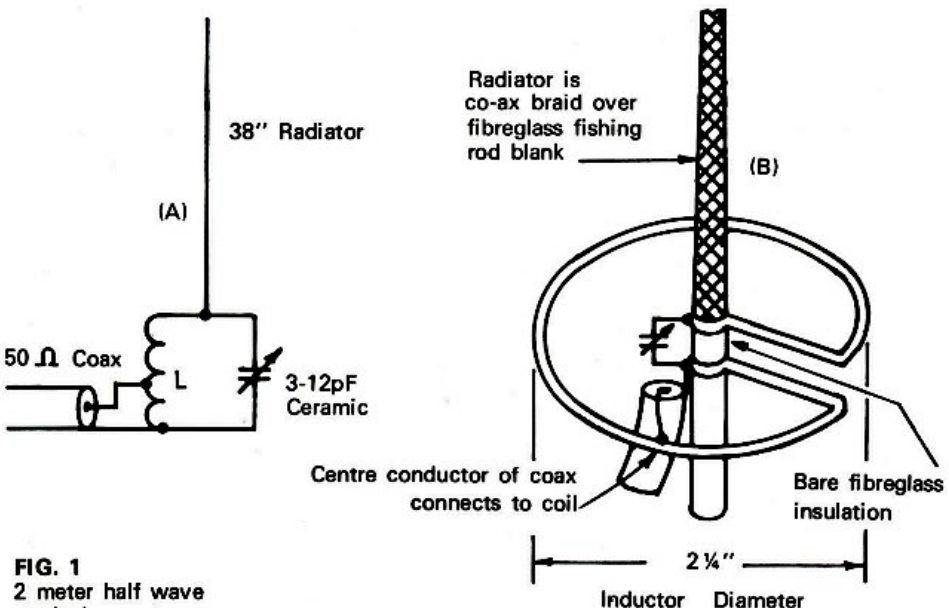


FIG. 1
2 meter half wave vertical

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looking back....

Fred M. Maddison
41 Knowles Street, Amellia Heights, Balcatta, 6021

Looking back to 40 years ago the usual forms of entertainment for most young boys were the occasional slide-show at the local Church Hall and visits to a museum. Schooling consisted of the Three R's plus the practical subjects of woodwork and science.

To me, those science lessons were the only joy of my schooldays and, by a strange coincidence, those days on which science lessons occurred were the only days on which I did not develop a 'mysterious illness' or played truant. Fortunately, the science master had a greater interest in electrical other than chemical experimentation.

In common with most other children I caught the usual childhood ailments of chickenpox, measles etc. and then, at the tender age of seven, I contracted the dreaded 'Cat's Whisker' disease which has remained with me to this day.

In its mildest form this disease does not interfere with the normal smooth running of a household; however, in its more virulent form it tends to disrupt the harmony of the house. My collection of radio receivers and components — obtained through schoolboy 'swapping' sessions — was hoarded away in my small bedroom which I shared with two brothers. It was not long before it became somewhat difficult to open the door, let alone get into bed.

When one and two valve receivers first made their appearance on the market, mass unemployment caused them to be beyond the means of most people. Consequently the crystal receiver remained very much in vogue — although they too were quite expensive, being sold in beautifully polished cabinets resembling deed or trinket boxes.

With the upsurge of public interest in radio a great deal of home construction took place and occasionally the national newspapers printed circuit and construction details.

Circuits of early receivers were very basic and mostly consisted of an untapped coil tuned by a variable capacitor plus a crystal detector and a pair of high resistance headphones. Long aerials and good earths were the order of the day and even though Q factors were unheard of, this and selectivity were of no concern because there were, from memory, only two broadcast stations in England.

In a very short time the theory and design of inductances improved dramatically. The most popular design was that in which taps from the inductance were brought out to brass studs which were, in turn, wiped with a knob-controlled arm. The detector, which used a germanium crystal, was contained in a dustproof glass tube.

The crystal was held in a little brass cup by three screws and this, in turn, was contacted by a small piece of wire attached to a movable arm attached to the other end of the glass tube — hence the term 'cat's whisker'. The preference was for a gold wire cat's whisker which, incidentally, was in the shape of a small spring.

Considerable time could be spent in probing the surface of the crystal for the 'loudest' spot and even the vibrations of someone entering the room could break the long sought after 'loud spot' although it proved to be that the coiled shape of the cat's whisker was slightly effective in reducing the vibratory loss of contact. Sophistication came with the construction of two crystal detectors placed side by side — at least one was guaranteed not to lose reception!

Needless to say, broadcast stations were springing up all over the world and for those fortunate enough to be able to afford a valved receiver it was comparatively easy to receive stations such as Radio Paris. However, crystal receiver circuits were still being improved upon and I was fortunate enough to come across one which the designer boasted would receive Radio Paris.

Basically the inductance was a wire-wound tube approximately four inches in diameter inside which revolved a tennis ball which was also wound with wire. This was known, I believe, as a variometer. Imagine my delight when, on hooking it up, Radio Paris came through; in fact it was so loud that when I coupled it to a 2000 ohm Ormond horn speaker the volume was amazing. When my father brought in the next-door-neighbours to hear a French-speaking horn-amplified crystal receiver my face was like that of a Cheshire cat.

I clearly remember persuading my mother to buy toilet rolls in order that I had ready-made coil formers. The progression from newspaper to toilet rolls was appreciated by the anatomy and, coupled with the advancement of experimental radio, was no mean achievement.

However, not all of my ideas were beneficial to the household and encouraging pats on the back alternated with discouraging smacks on the behind. For example, having read that warming batteries rejuvenated spent cells, I once placed a large 120v HT battery in a warm oven and returned to experiments which I felt would benefit mankind. Some considerable time later acrid fumes pervaded the house and a quick visit to the oven revealed a mass of molten wax, pitch and carbon rods bubbling away in their now empty cells.

On another occasion, having constructed my first mains operated receiver (transformerless), I discovered that excellent results could be obtained by using the frame and springs of the bed as an aerial, not realizing that the whole frame was very much alive — a fact which my mother quickly discovered when she attempted to make the bed!

To this day I am still plagued with the 'cat's whisker malady' and, in the hope that I may be of some assistance to other radio enthusiasts who may be as yet unaware that they too are sufferers, I submit below my current (no pun intended) medical report.

Reference Patient R5-S9

General, Pysical and Mental Fitness:
Has a Split Stator personality. Has ability to climb ladders, masts and clamber about roofs but suffers severe headaches and giddiness when painting or cleaning windows while standing on even the smallest stepladder.

Manual Dexterity:
Has a watchmaker's skill when winding small coils or working on printed circuits but is all thumbs when washing up and drying crockery.

Prescribed Treatment:
Many years of massive doses of QRN and electric shock treatment have elicited little response and it is felt that the introduction to FT 101 may be the only cure. ●

BELOW
Diode detectors have progressed a long way from the "cats whisker" detector.

how safe is your aerial

Chris de Combe VK5NQ
Flat 83 Blk G. Carriwan Street, Woomera, 5720.

As the last crash of thunder sent me leaping at least 6" out of bed and sent the cat dashing for cover I was suddenly struck by the thought *'How Safe is My Aerial'*.

A good aerial represents a large surface of metal which is positioned clear of any other objects. As such it is a potential lightning hazard.

There are several methods of protecting an aerial system all of which depend upon DC earthing of the aerial. For this protection to work and also more important to be safe, the earth used must be good and on no account should *mains* earth be used. A 5 foot metal rod sunk into the ground represents a reasonable earth system.

The most simple way to earth an aerial is to install a switch at the point where the feeders enter the shack. When the aerial is not in use it is switched to earth. For coax feeders an earthed socket can be provided to terminate the aerial.

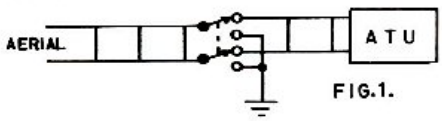
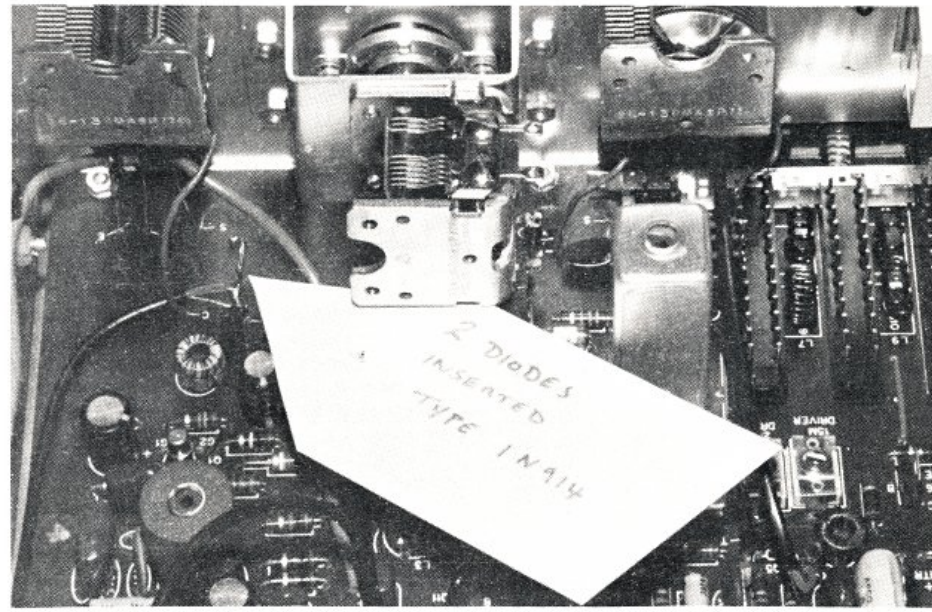


FIG.1.

The aerial switch Fig 1 works very well provided the switch is a high quality knife type but it has the great drawback that it can be forgotten. In one case the shack is not protected and in the other the station transmitter can be fed into an open circuit with nasty results.

A better method is to use automatic protection, using RF chokes to earth the aerial to DC but not to RF.

Suitable chokes should have a low DC resistance, that is wound with heavy gauge wire, and a reactance at least 5 times the line impedance.



ABOVE
Showing where the protective diodes were added to a Heathkit HW7.

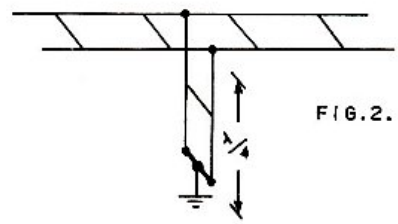


FIG.2.

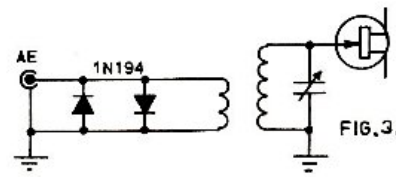


FIG.3.

Stations using a single band can use ¼ wave stubs with good results, Fig 2. A ¼ wave length of line connected between the feeder and earth will provide a low resistance DC path and yet a very high impedance to the RF.

When using coax cable the velocity factor of the cable should be taken into account. The length of the line being $\frac{\lambda}{4} \times VF$ where VF is typically o.6.

Lightning protection not only applies to aerials but also to towers and masts which should all be well earthed.

Care should be taken to ensure that a good connection is made to the tower and that the joint is weather proofed.

Lightning protection also gives protection against static build up which can be very high on dry days due to cloud movement

It is not often appreciated that this static build up can be large enough to cause arcing and certain damage to transistor and FET receiver inputs if they are not properly protected.

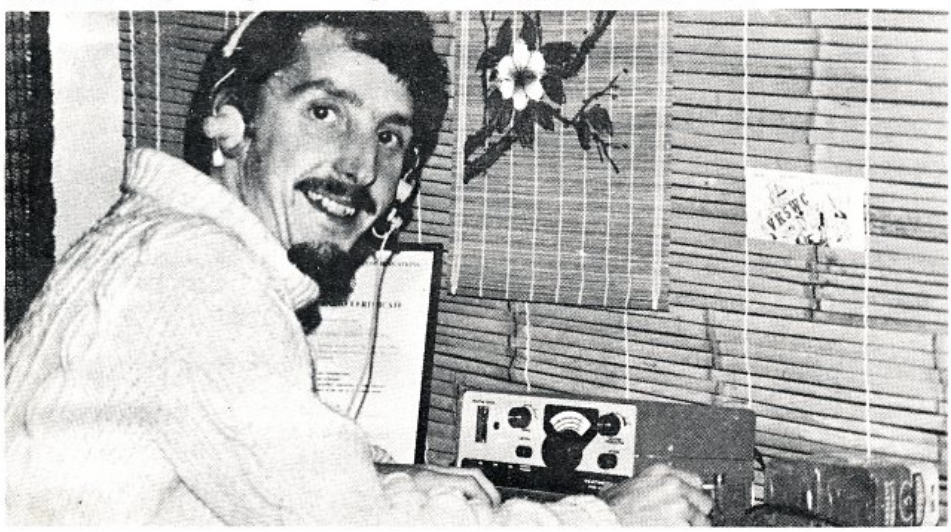
The protection methods so far mentioned will protect the receiver but an additional protection in the shape of two IN914 diodes connected across the receiver aerial terminals is worthwhile, Fig 3.

These diodes have a low capacity of about 4pF, so there is no effect to the receiver's performance but they have the effect of limiting the voltage across the aerial terminals to ½ a volt.

The diodes will also help protect the receiver from any RF leakage across the aerial change over switch when transmitting.

Having just carried out several of these ideas I can now sleep easily through any storm knowing that my shack is safe and my receiver protected. I hope you can do the same. ●

BELOW
Chris VK5NQ operating his own rig at the Woomera Radio Club VK5WC.



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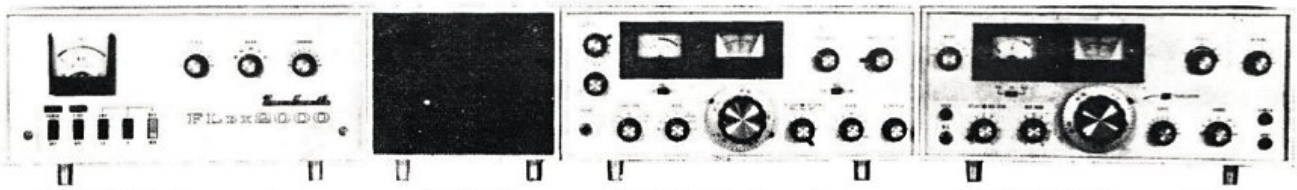

FL-2000B Linear Amp. 80 - 10 mx, G.G.

SP-400 Speaker

FRDX-400 Receiver 160-10 mx, WWV, C.B.

FLDX-400 Transmitter 80 - 10 mx, peak in. 300w.

FTDX-401 TRANSCEIVER: 80/10 mx, PA two x 6KD6, 560w. peak input SSB, choice of manual, PTT or VOX operation. Full coverage on 10 mx, offset tuning, calibrator. Includes fan, CW filter, noise blanker, **$550.**

FV-401 EXTERNAL VFO: For FTDX-401, **$115.**

FT-101B TRANSCEIVER: 160/10mx, SSB, AM, CW, PA two x 6JS6A, 300w. peak input SSB. Built-in dual AC/DC power supply. Low current drain transistorised except for transmitter driver and PA. Plug-in modules, I.F. noise blanker, FET receiver RF, clarifier, built-in speaker. Ideal for portable/mobile from 12v. DC, or in the shack on AC, **$579**

FV-101 EXTERNAL VFO: Matching auxiliary VFO for the FT-101, **$115.**

FT-200 TRANSCEIVER: 80/10 mx, PA two x 6JS6A, 300w. peak input SSB. Manual, PTT or VOX control, offset tuning, calibrator. Operates from a separate power supply, **$331**

FP-200: Yaesu AC Power Supply for FT-200, in matching cabinet with in-built speaker, **$90.**

DC-200: Yaesu 12v. DC Power Supply for FT-200, complete with special plug and cable, **$135.**

FT-75 TRANSCEIVER: SSB and CW. VXO, noise blanker, squelch. Very small size, transistorised, a superb little rig (see review "A.R." Sept. '72). Microphone and four crystals included, **$237.**

FP-75 AC POWER SUPPLY: 230v., for FT-75. Built-in speaker, power cable and plug, **$49.90.**

DC-75 DC POWER SUPPLY: 12v., for FT-75. Includes built-in speaker, mobile mount, power cable and plug, **$49.90.**

FV-50C VFO: for FT-75, **$45.**

FLDX-400 TRANSMITTER: 80/10 mx, PA two x 6JS6A, 300w. peak input SSB. Manual, PTT or VOX control, SSB, AM, CW. Adaptable to FSK for RTTY. Mechanical filter, **$436.**

FRDX-400 RECEIVER: 160/10 mx. Mechanical filter, I.F. "T" notch rejection tuning, calibrator. Provision for installation of FET VHF converters, FM, and 600 Hz. mechanical filter for CW. Can be coupled with the FLDX-400 for transceiving, **$428.**

FT-501 DIGITAL READ-OUT TRANSCEIVER: 80-10mx, SSB CW. 500w peak input, includes 2-speed cooling fan, noise blanker, clarifier, VOX and etc., **$760.**

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FL-2000B LINEAR AMPLIFIER: 80-10 mx. Tubes, two x 572B triodes in G.G., twin fan cooled. **$398.**

FL-2100 LINEAR AMPLIFIER: Similar to FL-2000B but styled to match FT-101, **$398.**

FL-2500 LINEAR AMPLIFIER: 160/10 mx, four x 6KD6 tubes, standard cabinet, **$315.**

FTV-650 SIX METRE TRANSVERTER: Converts 28 MHz. SSB to VHF, and includes receiving converter. Primarily designed for coupling with Yaesu models FL/FRDX-400, FTDX-401, FT-200, FT-101, with simple installation requirements, **$165.**

FT-2FB TWO METRE FM TRANSCEIVER: 10w., fully solid state, with mic. and power cable, **$225.**

FP-2AC AC POWER SUPPLY for FT-2FB, includes speaker and battery charger, **$59.**

FT-2AUTO FM TRANSCEIVER: Similar to FT-2FB but with addition of automatic scanning facility, etc., **$345.**

YC-355D FREQUENCY COUNTER: 8-digit capability to 200 MHz., **$385.**

FF-50DX three-section LOW PASS FILTER for TVI reduction. $22.

MATCHING EXTERNAL SPEAKERS for FTDX-401, FRDX-400 or FT-101, **$28.50.**

YD-844 DESK MICROPHONE: Yaesu De Luxe PTT Dynamic type with stand. PTT switch, and PTT is actuated when lifted from deck, **$39.50.**

DF-43B hand-held PTT **DYNAMIC MICROPHONE, $16.50.**

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hy-gain

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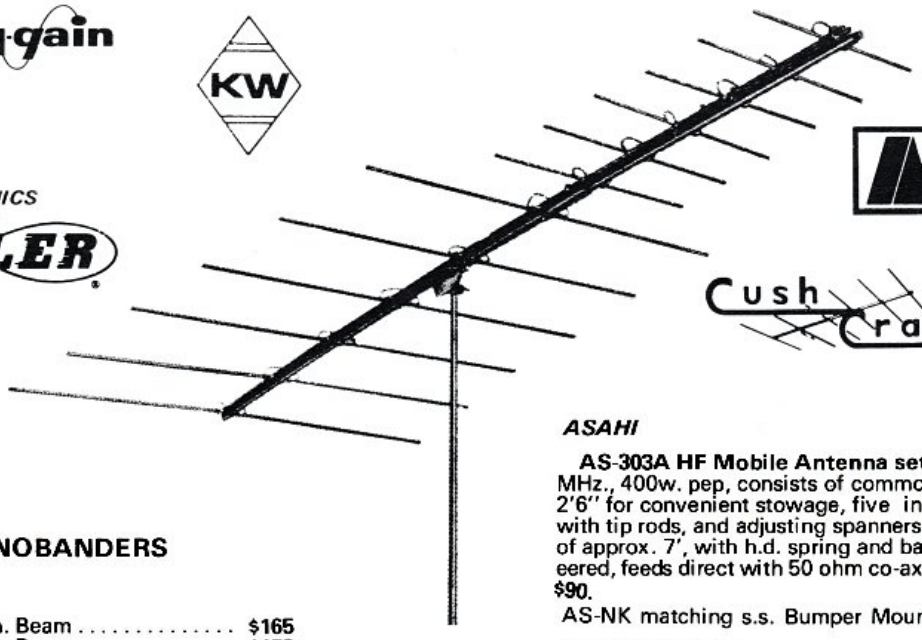
ASAHI ANTENNA

Cush Craft



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204BA, 4 element 20m. Beam $165
203BA, 3 element 20m. Beam $153
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12AVQ, 10m. thru 20m. trap Vertical $39

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MC-75, 80m $25
MC-40, 40m $22
MC-20, 20m $19.50
MC-15, 15m $16.00
MC-11, 11m $15.00
MC-10, 10m $15.00

YAESU

RS Series Gutter Mount HF Centre Loaded Mobile Antennas, consisting of gutter mounting base attachment and mast with 11'6" co-ax. and plug PL-259 attached (base mast doubles as a ¼ wave vertical on 2 mx) and interchangeable coils with adjustable tip rods for 40 mx to 10 mx. 150 watt **PEP,** 4'6" total length. Slim and neat, brushed chrome finish, a typical **Yaesu** quality product. RS base and mast, $19.50. Coils RSL-7 $19.50, RSL-14 $18.50, RSL-21 $15.50, RSL-28 $14.00.

ASAHI

AS-303A HF Mobile Antenna set, centre loaded type 3.5-28 MHz., 400w. pep, consists of common mast 4'6", telescoping to 2'6" for convenient stowage, five interchangeable loading coils with tip rods, and adjusting spanners inc., making a total height of approx. 7', with h.d. spring and ball mount. Beautifully engineered, feeds direct with 50 ohm co-ax. The complete set a steal at **$90.**

AS-NK matching s.s. Bumper Mount Adapter, for AS;303A. $

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Helical:

HW-80, 80m $25.00
HW-40, 40m $23.50
HW-20, 20m $21.50
HW-15, 15m $20.00
HW-11, 11m $20.00
HW-10, 10m $20.00

FITTINGS: (Suit all makes).

BPR, bumper mount $12.50
BDYF, heavy duty adjustable body mount $12.50
HWM-1, fixed body mount $12.50
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SGP-2, 2m. ground-plane $14.50
GPG-2, 2m. ⅝ wave ground-plane $25
GP-50, 25 thru 54 MHz. ground-plane 25

CUSH CRAFT

AR-2, 2m. half-wave gamma loop matched vertical $25
A144-7, 7 element 2m. Beam $21
A144-11, 11 element 2m. Beam $29.50
A144-20T, 20 element 2m. "Twist" Beam $59.50
Also available, 27, 52 and 430 MHz Beams and Verticals

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MAG ⅝ wave similar to MAG 150 but with ⅝ wave Whip. Complete with Co-Ax and Connector $28.00
MAG-150, magnetic mount ¼-wave whip (108 thru 450 MHz.) includes 18 ft. of RG58U and connector $22
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HMBA, telescoping mast for halo, and etc. $12.50

ASAHI

AS-2HR, ⅝-wave S.S. 2m. gutter mount, inc. co-ax. $28

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UHG-1, ¼-wave 2m. gutter mount, inc. co-ax $16.50

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A & R

351A, ferrite toroid Balun, 400w. PEP, 75U/300B **$11.50**
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HAM M, heavy duty Rotator, 220v. AC **$138**
Cable, 8-conductor, for Ham-M control ..... **65 cents-yd**
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LA-1, Lightning Arrestor, for installation in standard 52 or 72 co-axial feedline, designed to Mil. specs **$29.90**
LA-2, smaller size co-ax arrestor **$8.75**
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Q CRAFT

Porcelain Egg Insulators ..... **15 cents**
WIDE RANGE of Co-axial Cable and Connectors always in stock.

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Multi-band dipole traps with ceramic "T" centre insulator, 80-10m bands per pair complete with insulator
Co-Axial cable switch 3 positions **$17.50**

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Co-Axial Cable Switches 5 positions. Model 550G ... **$21.50**

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SWFS-2, single meter type, combined SWR and FS meter, 50 ohms, inc. FS pick-up whip, size 5" x 2" x 2¼". 3-150 MHz UHF Corectors **$14**
SWR-2, dual meters, 50 ohms. Simultaneous reading of forward and reflected power, 5" x 2" x 2¼". 3-150 MHz UHF Connectors **$20**

OSKER

SWR-200 large dual meters, switched 50-75 ohms, with calibration chart for direct power readings to 2 kw. in three ranges. A very elegant instrument. 7⅝" x 2¾" x 3¾" ... **$37.50**

K.W. ELECTRONICS

Z Match Antenna Couplers, 80 metres to 10 metres. Rated at 1 kw. pep maximum with SWR less than 1.5:1, beautifully finished in communication grey (see review "QST" July 1972):—
KW E-Zee Match, screw terminals at rear, size 5½" x 6" x 12" **$48**
KW-107 Supermatch, as above but with addition of SWR meter, power meter with large 50-ohm dummy load to read up to 1 kw pep, UHF sockets at rear. A superb piece of equipment, 7" x 8" x 13" **$145**
KW-103 SWR POWER METER uses toroidal coil pick-up for continuous operation 52 ohms 1kW max. to 30 MHz SO239 UHF sockets **$40**
KW Dummy Load 52 ohm Air Cooled. Will handle up to 1 kW (ideal for use in the workshop or field) **$28.00**

HEATH KIT

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EK-26 Electronic Keyer, a high quality job with 23 solid state devices. Inc. paddle, and suitable for operation from 230v. AC or 12v. DC. Relay and transistor switching, built-in monitor osc. and speaker. Surely the best value today in electronic keyers. **$69.50**

AT-3 RF actuated CW Monitor and **Code Practice** Audio Osc. uses 4 transistors, 2 diodes, with built-in speaker and tone control.
Requires one UM3 penlite cell. In grey metal case, 2" x 3¼" x 3½" **$16**
EKM-1 Audio Morse CP Osc with speaker, one transistor. Headphone socket and tone control, requires one UM3 cell, in black metal case 3¼" x 3¼"x 1⅝" **$8.00**
AT-8 Audio Osc, larger de luxe type CP Audio Osc, 3 transistors. Includes relay for transmitter keying if required, and headphone socket. Tone and volume controls. Plenty of volume, suitable for group practice or tests. Nicely finished brown metal cabinet, 3¼" x 5" x 5". Requires four UM3 cells **$30**

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FT-101B SOLID-STATE TRANSCEIVER

SOLID-STATE BREAK THROUGH

10 FET's, 3 Integrated Circuits, 31 Silicon Transistors, 38 Silicon Diodes • Computer Type Plug-in Modules

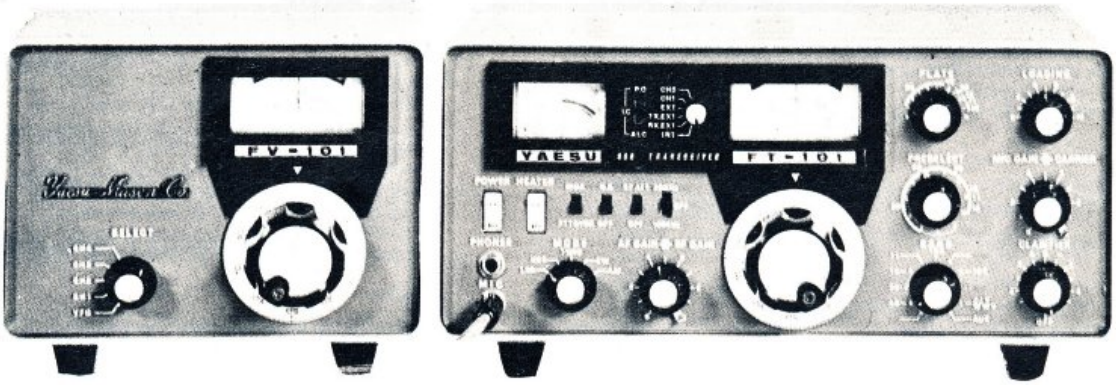
Portability demands light weight, small size, and power source flexibility. The FT-101B weighs 35 pounds complete with built-in 12 volt and 230 volt power supplies. Compact solid-state construction affords convenient transporting in over-night style luggage.

The FT-101B is not only designed for mobile or portable use, but excells as a primary base station. The transceiver features high receiver sensitivity and transmits power capable of driving the most powerful linear amplifiers available today.

The FT-101B is fully guaranteed for **90 Days** following date of sale, and **continuing** service is provided for your complete satisfaction.

The new model includes a built-in cooling fan.

All bands 160-10m, with plug-in noise blanker, and indicator lights for VFO and clarifer on.



Maximum Input Power: 260 W PEP SSB, 180 w CW, 80 W AM.
Sensitivity: 0.3 Microvolt for 10 db S/N
Selectivity: 2.4 KHz (6 db down), 4.2 KHz (60 db down)
*CW Filter — 0.6 KHz (6 db down), 1.2 KHz (60 db down)
Frequency Range: 3.5 to 4, 7 to 7.5, 10 to 10.5, 14 to 14.5, 21 to 21.5, 27 to 27.5, 28 to 30 (Megahertz) & 160M Band

Frequency Stability: Less than 100 Hz drift in any 30 minute period
Antenna Impedance: 50 to 100 ohms-SWR 2:1 or less
Audio Output: 3 watts, 350-2200 Hz, 4 Ohm impedance
Devices and Tubes: 10 FET's, 3 I.C., 31 Si Tr, 38 Si diodes
One 12BY7A driver, Two 6JS6A final amp.
Power Source: 12 volts DC, or 100, 117, 200, 220, 234 volts AC
Power Consumption: AC; Receive .5 A, Transmit 3 A.
DC; Receive .5 A, Standby 5 A, Transmit 20 A Max.
Dimensions: 13½" wide, 6" high, 11½" deep
Weight: 35 pounds.

FREQUENCY REJECTION STANDARDS

Carrier Suppression: 50 db down minimum
Unwanted Sideband: 50 db down minimum
Distortion products: 30 db down minimum
I.F. and Image Ratio: 50 db down minimum

FT-101 CHECK LIST

Built-in AC and DC power supplies
Built-in WWV 10 MHz band
Noise Blanker
25 and 100 KHz Calibrators
Built-in VOX
±5 KHz Clarifier
Break-in CW with Side Tone
1 KHz Dial Read Out
Selectable SSB
AM Capability
Built-in Speaker
Microphone
Crystal Channels
Dual VFO Adapter

ACCESSORIES

External VFO .....Model FV-101
External Speaker.....Model SP-101
Mobile Mounting Bracket
*CW Filter (.6 KHz)

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las balsas

S. E. Molen VK2SG

The Australian Communications Co-ordinator
13 Pendle Way, Pendle Hill, 2145.

By the time you read this, you will have heard of Las Balsas, and of their epic trip across the Pacific Ocean. Three rafts and twelve persons braving the elements for long periods and landing at their destined point on the Australian coast. Of course you have also heard of the part that AMATEUR RADIO played during the trip. Amateurs all over the Pacific, the Americas and Australia combined to assist with the communications.

Just how does one become involved in something like this? What must one give to people who do this kind of thing? The only way that I can explain is to cast my mind back to 1970, when Vital Alsar made his first trip to Australia. At that time he used Amateur Radio as his communications. If one remembers, he did have difficulties with his transmitter, mainly that seawater seeped onto the audio board and ate the copper away, thereby preventing the audio getting to his transmitter. All that could be heard was the transient clicks as the press to talk button was pressed. It was about this time that I was asked to assist the Mexican stations with the communications. This proved successful and with the assistance of several other stations (who are again assisting) we finally managed to get the rafts ashore successfully at Mooloolaba in Queensland, despite certain doubts raised by some people in official positions.

On Vital's return to his home we had kept up an intermittent correspondence (I am a lousy letter writer) until October 1972 when I received the following letter, I quote in part:-

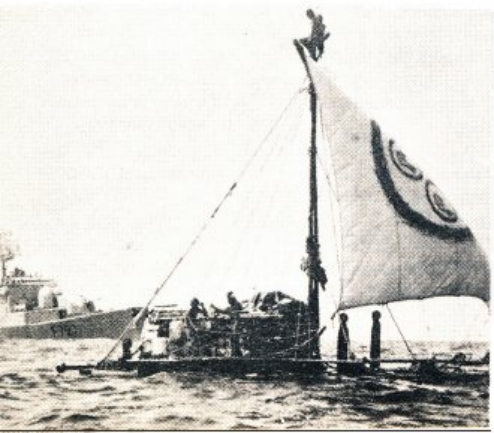
"We are planning another expedition, with three rafts this time. They will be called ***"Guayaquil"****,* ***"Aztlan"*** *and* ***"Mooloolaba"*** *in honor of Ecuador, Mexico and Australia. The name of the expedition itself is* ***"Los Huancavilcas"****, an Ecuadorian tribe which are thought to have been navigators who sailed in rafts across the ocean.*

We will leave the first week of June (first Sunday) 1973 from Guayaquil. We will be in Ecuador the first week of April building the rafts and hope to reach Mooloolaba again. We will be sailing together and I hope we will all reach Mooloolaba at the same time.

This time we will take a different route thereby definitely proving that the raft could have been a means of transportation in Precolombian times. This does not mean to say that I think people went from Ecuador to Australia. We will be twelve men with nine different nationalities, four men on each raft. The principal object of the voyage is to study how one can survive at sea, and the human element. We will also be conducting other marine experiments.

Syd, I wish that you could have the same network as you did on the previous voyage, and for you to be the "bossman" as you were before. I will leave that to you to plan as I know you will. If you will contact XE1EB (Admiral Samuel Fernendez), XE1NF (Roberto (BOB) Romero) and XE1CI (Nelly and Marcos Lazard) and let them know the time and the frequency and the day, whenever you say they will be ready to listen. I do hope that it will be soon so that we can be in contact before the expedition starts.

Thank you very much for your trouble," etc . . . . .



When one receives that kind of letter, what can one do? Well as you guessed I replied, and we set up skeds with Nelly XE1CI on a fairly regular basis through January, February and March. Of course there was a lot of correspondence as well, for I wanted things like radar reflectors fitted and also some emergency radio equipment as carried in lifeboats, in addition to other gear that was felt necessary for safety of life at sea.

In the final consumation we agreed on some things, and disagreed on others, but in the main we compromised on what we felt would be best and most conveniently carried by the rafts, which you must realise would have to carry a fairly heavy load of food, water, equipment and personnel.

In April, Vital and the crew moved to Ecuador to start the building of the rafts, which were built of female balsa logs cut at the right time of the month, so that the logs are in their least absorbent condition. Strange to say the male logs are very hydroscopic and do not last any time in water. So female trees are used and these have proved very durable. The construction of the rafts, provisioning, and preparing took them well into May. The date for sailing was then set for the 27th May 1973, as the tides, current and winds appeared that they would all be favourable at that time.

During the time that Vital and the crews were constructing the rafts, Nelly XE1CI, Samuel and myself set about organising the necessary networks. In the Americas and under control of XE1CI were the following stations:-

XE1CI, XE1EB, XE1NF, XE1TX, XE1FFC, HC2OM, W6FQ and VE2BBS.

As for myself, my mind went back to 1970 and to the stations who had been the main standby's namely VK4LZ and ZL1RO. Both of these stations had given unlimited assistance previously and it was felt that they would again be able to provide qualified assistance due to their previous experience with this type of operation. There were other stations with whom I had had considerable contact over the years and who I had met personally on several occasions. I felt they would fall into the operation with ease; they were VK4GD and 9VIRA. There was also a station in the Cook Islands who was approached and who had signified his willingness to assist but, due to occupation commitments, was not able to assist at the appointed time. Luckily his place was ably taken by another station from the Cook Islands who did an excellent job. But more of that later as we approach the Cook Islands on the actual trip.

Basically that was the setup as the rafts left Guayaquil in Ecuador on the 27th May, 1973 at 1700 GMT. The rafts were towed to sea by an Ecuadorian Naval tug with the intention of injecting them into the Humboldt Current but due to the tow rope breaking just as they were entering the northward flow, they experienced some difficulty in remaining in the current. With the winds blowing from the south west they found themselves being blown back to the coast and finished up behind one of the coastal islands named Santa Glada. After some days struggling against adverse winds and currents, the Ecuadorian Navy sent another tug to tow them well out into the Humboldt Current and turn them loose.

During this time, the communications between the rafts, Mexico and Ecuador were excellent (with some QRM) but with Australia it was, to say the least, very difficult. However Nelly XE1CI who was the control station was passing all the information to me and the stations who were listening in Australia, so at all times we knew just where the 'boys' were and how they were faring.

From where they were finally turned loose in the Humboldt Current until they neared the Galapagos Islands, the trip was fairly uneventful, with winds never above force 5 and the waves never reaching more than 6 metres high. As the rafts passed the Galapagos Islands on the 11th June, it was hoped that they could receive some fresh fruit and vegetables and have a celebration, because this was their first big hurdle owing to the current flow around the islands, which could have taken them onto the islands and wrecked the whole trip. Unfortunately, the yacht that was to have met them had a faulty compass and could not find them and even had difficulty finding the islands on its return trip, so contact was not made and the rafts drifted on their lonely way.

It was not until the 6th July that they made physical contact with the outside world. The M.V. TEKOA appeared out of the predawn murk and almost passed them by, until the

rafts attracted their attention by firing rockets. To quote the captain of the TEKOA as reported in the Auckland Star on the 24th August, I quote

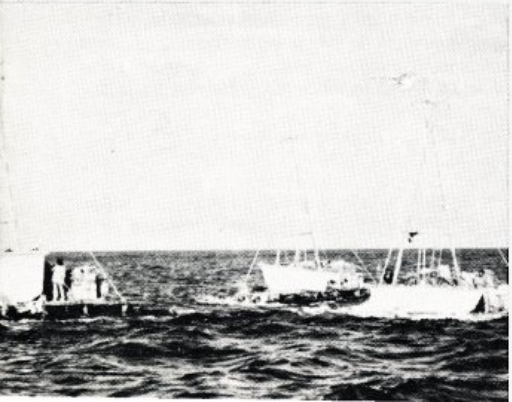
"He had the very odd experience of meeting three Kontiki type rafts in mid ocean, and their leader buying three cwt of groceries and wanting to pay for them in cash. He also said that to his mind such expeditions were crazy, but the leader of the expedition said "nothing to it".

Anyway, the skipper of the TEKOA gave them a present of 24 cans of beer before he went on his amazed way."

From this point longitude 104 degrees 25 minutes west 00 degrees 51 minutes south onto the Marquessa Islands they had a fairly smooth though slow trip. With, of course, the occasional storms which apparently were up to the usual Pacific standards of waves up to 10 metres high and winds up to force 7. It was during this period of travel that the two parrots they had on board decided that they could make better time on their own, so early one morning they took off and headed west. This was not the best direction for them to go, as the rafts at that time were about 1200 miles east of the Marquessa Islands, the nearest land in the direction the parrots were last seen heading. As it would take sustained flying and good navigation for these birds to reach the islands, it was generally felt that the birds would not make it.

When the rafts were about six days away from the Marquessa Islands I had a contact with the yacht "SEEKER" HP9XGB-MM, who enquired as to the position of the rafts. Bruce had been trying to follow the rafts, but radio conditions had not been good and he had missed hearing some of the skeds. The interesting thing is that he had passed within three degrees of the rafts as he sailed from the Galapagos Islands to the Marquessa Islands, and he was now at anchor in the Marquessa Islands. As the sked with the rafts was the next day, I invited him to be on frequency at sked time. The next day, the sked went as usual and, after the formal information had been passed, I called Vital and asked him if there was anything that he needed from the Marquessa Islands? Vital suggested that he would appreciate certain fresh fruit. At this point, I called HP9XGB-MM and introduced Vital to Bruce.

After primary discussion it was decided that a sked the next day would be advantageous and would give Vital a chance to get his grocery list ready. The next day the grocery list was passed to Bruce who did a marvellous job rounding up the necessary goods. But one thing had us wondering. After three repeats we were all sure the boys were beginning to feel the strain of the trip. Vital had asked for **24 teaspoons!**



It turned out that they had been teaching the monkey they had on the raft to eat with a spoon and he had responded marvellously. Unfortunately he was also lazy and did not like washing up. After he had finished his meal he would hurl the spoon into the sea and the rafts were now running very short of spoons.

Vital had also asked for a pair of dental pliers, for apparently one of the crew had tooth ache. It turned out that Bruce on the "SEEKER" had a doctor on board and he would be coming with them to meet the rafts. Contact with the rafts was made on the 20th August and the groceries were transferred in a most efficient manner. Bruce had three dingies on board, each one loaded with the stores for one raft. As he sailed past the raft he let the dingy go so that the raft could unload it without too much trouble. While this was going on the doctor was having a look at the condition of the crews and removing the offending tooth.

The crew of the rafts were very grateful to Bruce and his crew on the yacht for his effort. It will remain in their memories as one of the highlights of the trip. After several hours of enjoyable meeting the rafts sailed on and the yacht "SEEKER" returned to the islands. I believe the people on the yacht were pleased to reach an anchorage because Bruce said it was very, very rough out there.

The course of the rafts took them north of the Society Islands and north of Bora Bora Island. It was between the Marquessa Islands and the Society Islands that they ran into a fairly heavy storm. Heavy enough to make the monkeys leave the deck and head up the mast to get out of the sea water that was flowing over the rafts. Apparently the rafts were pitching hard enough to shake both the monkeys off their grip on the mast and unfortunately both monkeys were lost during that night.

By this time several yachts had been alerted that the rafts were passing north of Bora Bora and from the indication we received it looked like the traffic in the area would be very heavy and could almost develop into a traffic jam. Unfortunately, the seas did not abate to any extent and it was only the larger vessels such as the "MAGIC DRAGON" VEOMCG-MM with Dan as the skipper, and the official vessel of the Governor of the Society Islands (with the Governor on board) who managed to meet the rafts. The Governor had sailed up from Tahiti to meet the people on the rafts. The meeting went off very well, and I believe a good time was had by all. The alerting of the Governor as to the position of the rafts and their impending arrival near Bora Bora was ably handled by FO8AU who spent many tiring hours on frequency assisting the rafts.

After leaving the Society Islands the seas became a little rougher and lifted to 10 to 11 metres. It was during a storm in this area that the Mooloolaba suffered a little damage to its sail which was repaired but caused trouble at a later date.

The intended track of the rafts took them through the Cook Islands and ZK1AA who had been on frequency for about the past week found the rafts almost passing his doorstep. He also was able to assist with the communications and in turn alerted the Premier of the Cook Islands as to the raft's position. The Premier in turn offered to assist in any way possible, but unfortunately an aircraft sent out to sight the rafts could not find them. No contact was made but the Premier did send the following message to the rafts.

"To the leader of the expedition Las Balsas. The Premier, Government and people of the Cook Islands convey their best wishes for the success of your journey. And the protection of Tangaroa as you all pass over our Pacific waters". (Tangaroa is the god of the sea in the Cook Islands).

After leaving the Cook Islands and heading for Tonga in what is purported to be deep water, according to all marine maps, the leading raft came to a grinding halt on a coral reef. Luckily it was only a small reef as the other two rafts who were within 1000 metres of this raft did not touch it. As it was unmarked on any marine maps we have called it Las Balsas reef. The name has not been ratified as yet nor has the position been checked, but when it has and if the name is accepted, we will at least have a reef to remind us of this trip.

Later, during a storm that lasted for five days, the sail on the Mooloolaba, which had previously given trouble, came undone from its lashings and the raft fell behind the other two during the night. The raft was not sighted again for six days. Unfortunately the transmitter on the Mooloolaba was not operating so it was not possible to contact them and find out just how far astern they had fallen. But, we did know that Marc Modena the skipper of the raft had a short-wave radio on board and usually listened to the news services from Radio Australia. I approached Radio Australia and asked them to broadcast the position of the other rafts so that he may know in which direction they were travelling, and try to catch up with them. Six days later there was another storm (these storms seem to be a feature of the Pacific Ocean) and to repeat Vitals words *"winds gusty to heavy force 7 to 9, seas moderate to rough, waves 10 to 12 metres high"* when over the horizon came Marc, with repaired sail fully set and charging along, like an express train.

Again the rafts were together. It may seem strange that after having travelled in excess of 6000 miles across the ocean this was the first time that one of the rafts had been out of sight of the other two. However if one considers that they were all in the same current and in the same wind areas, and that the rafts do not have rudders to steer with, it is not hard to understand their togetherness.

From Tonga to south Fiji the seas remained rough and the yacht FREJA who had hoped to cross their path on its trip from Fiji to Auckland had to turn back because of the rough seas. I believe this is a well founded vessel with a very experienced crew, but on that day Vital said that the seas were moderate and the winds had dropped considerably and they were only force 5. I

suppose it is a matter of relativity as to how one assesses rough seas.

The course from south of Fiji to south of New Caledonia, was maintained in an almost due westerly direction, and as the winds dropped to a steady 15 to 20 knots and the seas abated to about 3 to 5 metres high, the speed of progress decreased slightly to about 150 miles every four days. On the sked of the 18th October the stations from Mexico were very weak, and I had to handle all the traffic to and from the rafts and pass it all back to Mexico.

It was during this sked that Len VK4GD broke in to ask a question. As Vital was hearing both Len and myself, I told Len to ask his question. It appeared that His Highness the Duke of Edinburgh (Prince Philip) would be in Townsville for the Youth Award presentations and had indicated his willingness to talk over the Townsville radio club station VK4TC. As Len is one of the officials of the Townsville Radio club, it was on his suggestion that the rafts be approached for the purpose. Vital was very excited at the suggestion and a sked was made for Tuesday 23rd October at 0600 GMT when His Highness would be there. Unfortunately the conditions were not the best on Tuesday. That, together with the number of stations that were jamming on the frequency, prevented a good contact between the rafts and the Townsville Radio Club. This was regretted but Vital on the raft felt that he had achieved something for the Radio Club, as he did talk to some of the members of the club while awaiting the arrival of His Highness.

Also when one considers that the weather out at sea, where the rafts were, was not really perfect, with heavy rain and 15 to 18 knot winds, it can be realised that Vital considered it an honour to have the opportunity to talk to His Highness the Duke of Edinburgh. ●

Letters to the Editor

Any opinion expressed under this heading is the individual opinion of the writer and does not necessarily coincide with that of the Publishers.

Dear Sir,

I refer to the Sunday morning broadcast from VK3WI on the 21st October, 1973 wherein listeners were invited to comment on your comprehensive report relating to **Amateur Band Planning.**

References were made to the forthcoming Colour Television transmissions with their obvious interference problems and we were also reminded of the ever-present threat of incursions into the amateur band allocations by commercial interests.

Almost every Sunday the Band reports for SWL's state that "nothing was heard on 10 metres". What kind of advertisement is that? One Decimal Seven megahertz and just because the Band is not 'open' nobody is interested. How do you know any Band is 'open' unless operators use it? Gentlemen, perhaps someone is very interested in some of that 1.7MHz.

I cannot understand why the WIA did not persist with their 10 metre campaign for novices following the last Easter conference.

The writer considers that a fresh submission should be made to the Post Office proposing that part of 10 metres be made available to the novice operators in lieu of the 11 metre segment stressing that this transposition is designed to minimise interference to the aeromodellers and radio paging systems used by the Industrial, Medical and Scientific services.

Of course there are several other reasons why the WIA should consider this proposal, the first being that at long last the 10 metre band would be in continual use (and we would have that band report), secondly the low cost CB gear would easily convert and thirdly some good DX could be worked with the American amateurs who no longer have the 11 metre band.

As the Novice Licensing System is reviewable after 5 years it would be well worth the effort to avert any possible cause for criticism from the commercial operators and the relevant authorities. The writer is of the opinion that the most likely area for concern regarding the Novice License will be the 11 metre allocation.

Yours faithfully,
M. R. Morris.

20 Years Ago

with Ron Fisher VK3OM

DECEMBER 1953.

Amateur activities were obviously slowing down during December 1953. The Editorial page was devoted to a review of the year's achievements which included the Limited AOCP and the privilege of sixteen year olds to sit for the amateur examination. On the Federal front, progress was reported on the preparation of the new Call-Book with advertising copy rolling in. It was suggested that amateurs with a flair for design should submit ideas for the front cover.

DX highlights for December were that ZC3AA was operating from Christmas Island on phone and CW. ZL3JA was planning a DXpedition to Tokelau Island using the prefix ZM7. G2RO was intending to operate from Sarawak and Borneo and George VK3ADZ was on his way to Heard Island complete with 100 watt rig for 7 and 14MHz.

The list of Institute office bearers published at the head of the Federal and Divisional notes section makes interesting reading, the various presidents and secretaries were as follows: Federal; G. Glover VK3AG and G. M. Hull VK3ZS. New South Wales; Jim Corbin VK2YC and D. H. Duff VK2EO. Victoria; Gordon Dennis VK3TF and Col Gibson VK3FO. Queensland; J. A. Weddell VK4FT and V. P. Green VK4VS. South Australia; W. W. Parsons VK5PS and R. G. Harris VK5RR. Western Australia; G. A. Moss VK6GM and J. Mead VK6LJ. Tasmania; L. E. Edwards VK7LE and F. J. Evans VK7FJ.

Technically the December issue started off with the S-N 6 Cascode 2 Metre Pre-Amplifier. Reprinted from *Ham News* it described the development of a high performance 2 metre front-end using a 6BK7 cascode to a 6AK5. A noise figure of 5 to 6 dB was claimed which makes an interesting comparison with modern solid state RF amplifiers.

Part five of Amateur Television by E. Cornelius VK6EC. A summary of troubles experienced in certain sections was discussed plus a circuit of the Video Mixer Monitor. ●

Magazine Index

With Syd Clark, VK3ASC

HAM RADIO July 1973.

Slow Scan TV Test Generator: Operational-Amplifier Relay for Motorola Receivers: Low-voltage Super-Regenerative Receiver for VHF: Importance of Standing-Wave Ratios: Frequency Synthesiser for Two-Metre FM: Transistor Curve Tracer: Designing Impedance Matching Systems: How to Compare the Efficiency of Linear Power Amplifiers: Ham Sweepstakes Winners.

QST August 1973.

The Micromountaineer: Recycling Obsolete Gear: How to Solder (VK3AOH): The WB4VVF Accu-Keyer: Bearing and Distance Calculations by Sleight of Hand: The Rochester VHF Converters: Quality Recipe for a Portable Package: Another Look at Reflections: Charging Nicad Walkie-Talkie Batteries: Reviews: Heath HA-202, Hallicrafters FPM-300, MT-5 Morse-TT Translator, Heath GR-110: How to Achieve an Impressive DX Score: The Sixth Amateur Satellite: Planning for the Future.

QST September 1973.

A Bite Size Beam: A High-Performance Balanced Mixer for 1296MHz: An HF-Band Solid State Amplifier: A DSB and CW QRP Transmitter: MOSFET Preamplifiers for 10, 6, or 2 Metres: A Medium Power HF SSB CW Transmitter, Pt 3: A Packaged Keyer and T-R Switch: Reviews; Heath HM-2103, E. F. Johnston 550 & 557.

RADIO COMMUNICATION. August 1973.

The Pipsqueak: Tilting with the Stolle Rotator: Intense Radio Aurora: An Integrated Circuit Speech Compressor.

RADIO COMMUNICATION. September 1973.

Phase Locked VFO for 2M Transmitters: Equipment Review; The Trio Model TS515 SSB Transceiver.

73 Magazine. August 1973.

Mono-Band Log-Periodic Antennas, Pt 1: An Acoustically Coupled Digital Keyed Squeaker for Tone Burst Entry: Theory and Design of VHF & UHF Amplifiers Utilizing RF Power Transistors: The Amateurs Intercom: Novel 160M Antenna: A Basic Solid-State Slow Scan Television Monitor: Low Cost Frequency Counter: VOM Design: Simple QRP Transmitter: The Numbers Game: Distribution of DXCC Holders: Solid State Exciter for 450MHz: Talk Power and FM.

BREAK-IN. September 1973.

Antenna Balun on the Cheap: Yaesu Musen FT101 on 5680kHz: A Versatile in-line Reflectometer Wattmeter: Adventure into Solid-State Direct Conversion: Electronic Loo Lock. **Mobile News July-August 1973** contains details of an "Automatic 80 Metre Mobile Antenna Tuning Unit".

Sundry other small Journals such as "EEB"; "Collector & Emitter" & "Amateur Radio News Service Bulletin" come to hand quite regularly and although not reviewed, sometimes provide interesting reading. ●

Awards Column

with BRIAN AUSTIN VK5CA
P.O. Box 7A, Crafers, SA, 5152.

Alterations to Listings of DXCC

Phone:

VK4VX	303-304
VK4FJ	290-314
VK3JW	286-290
VK4RF	252-254
VK4CZ	241-242
VK3SM	206-210
VK4XJ	195-200
VK5WV	180-182
VK4KX	5-5

C.W.:

VK3AHQ	311-331
VK4FJ	293-322
VK4VX	266-268
VK4KX	237-239
VK4RF	228-246
VK4XJ	150-157

Open:

VK2VN	314-336
VK4VX	309-312
VK4FJ	303-238
VK4RF	274-288
VK4KX	241-243
VK4XJ	226-234

New Member:

VK8ZZ	100-100

Would all applicants for awards please note that the postal registration fee is now 75c in addition to postage. An alternative to registration is to use certified mail, which costs 25c plus postage.

When forwarding cards for checking, please enclose sufficient stamps, postal orders etc. to cover their return by registered, certified or ordinery (air or surface) mail, whichever you prefer. ●

IGNITION INTERFERENCE

In the U.K., the Wireless Telegraphy Regs. require that combustion engines do not radiate electro-magnetic energy exceeding specified limits between the frequencies 40 to 70MHz. This has been recently extended from 40 to 250MHz according to Sept. '73 *Radio Communications.*

Callsign Identification.

Radio Communication quotes the G licensing conditions about identification by callsigns as "The callsign . . . . shall be sent for identification purposes at the beginning and at the end of each period of sending, and whenever the frequency is changed. When the period of use exceeds 15 minutes, the callsign shall be repeated (in the same manner) at the commencement of each succeeding period of 15 minutes".

Newcomers Notebook

with Rodney Champness VK3UG

44 Rathmullen Rd., Boronia, Vic., 3155

Radio Construction Bits from Hardware Stores, etc.

Hardware stores and the like can be a ready supply of items adaptable for use in radio construction.

Jon VK6TU and Rex VK2YA have both been of considerable help this month in bringing to your notice items that can be used for other than their intended use.

I quote from Rex's letter —

"About your idea of using NON-RADIO bits and pieces for radio purposes. What about plastic pill bottles as coil formers — easily drilled and mounted on panels, bases, etc. Can be tied up to valve bases to make plug in coils, using some sort of strong adhesive. Also, can use as insulators for aerials by drilling the right holes and attaching the necessary wires.

The coloured tops of various kitchen-type containers have a wide range of applications. Some make "beaut" panel light bezels — reds, blues, whites, greens, etc. Also they can be persuaded to act as knobs and dials for tuning purposes. A bit of ingenuity can overcome the disadvantages of a three-eights shaft and a plastic container-top with a half inch hole. Pad up the shaft diameter with insulating tape or Bandaids, or something similar, and use the strong adhesive to keep the cheap, home-made knob in place. There may be problems if you want to remove these but, as they cost nothing, nobody will be greatly upset if they have to be broken in the process. The tops of toothpaste holders — the large economy size — can be cut off to make a flanged type of control knob. You can even engrave or otherwise mark the flange to show numbers or whatever you want.

The plastic containers for Vitamin pills are good for storing nuts and bolts, solder lugs, small items. Simple projects involving small wooden boxes can be improved by sticking on a cover of cooking foil — look for all the world like "metal boxes". Cunning. Dressing up projects with "DYMO" labels is an old gag and the old-timers will need no advice on this. Radio clubs could buy "Dymo" machines from club funds and charge at least enough to show a profit when selling desired labels to Club members.

Front panels of various equipments dress up nicely with handles from the hardware store. Vents for metal boxes with heat-generating valves inside can be obtained in a wide range of sizes and shapes from the local hardware man.

Small rubber "feet" may be used to advantage with all boxed gear to prevent scratching the polished top of the dining room table. Looks a finished job, too. Chrome plated handles can be fixed to the topsides of metal or wooden boxes to facilitate the operation of moving gear from Point A to Point B.

Does anyone ever use "stand-off" insulators? Easy to make. Plastic pill container with screw-on lid. Drill hole in the dead centre of the bottom of the container and fit a terminal of suitable design. Screw or bolt the lid upside down in the desired location and then screw the terminal-bearing body of the container into the normal threads of the lid and lo, a stand-by terminal — for almost no pence.

Supermarkets and chain stores offer a wide range of aluminium cake pans — some (the not-too-flimsy types) being okay as chassis for a wide range of projects. Small transistor projects can be built in small rectangular plastic containers.

The good thing to do is to develop a specialised sense which can — with due experience — lead the newcomer to look at almost everything with the mental query:- "How can I use ***that*** *for some construction project?" I must admit to looking at small items like Kombi Vans as potential mobile radio centres with all sorts of aerials stuck hither and about."*

Thank you Rex for all this information, I am sure that it will be of help to more than just our newcomers. Now to a couple of hints from Jon VK6TU.

"My transceiver required several extension shafts and I used lengths of brass welding rod, about ¼" diameter. This may have some kind of gauge number, but I do not remember now as I bought it many years ago. Universal joints were used at the inner end and the panel end passed through rubber grommets mounted on the aluminium panel. The rods were bought in lengths of about 1 yard. Been going for years now."

Thank you Jon for your tips.

Have you ever thought of using plastic drink straws for spaghetti. A more suitable item is the plastic tubing which is available in many colours from craft shops. The diameter of the tube available varies from about 1mm to 6 or 7mm. Laminex sheet makes a reasonable board for transistor projects, although not as neat as printed board. Does anyone else have ideas on what can be used for radio projects along the lines of the above? That's all for this month. ●

Try This

with Ron Cook VK3AFW
and Bill Rice VK3ABP

TUBE ADAPTER

To improve the performance of older receivers, it's often necessary to replace an octal tube with a 7-pin miniature. As shown in Fig. 1, an easy way to do this is to make an adapter from a 7-pin socket and a male multiwire connector.

Begin making the adapter by removing the grommet from the connector cap. Then determine if the miniature socket will fit flush with the top of the cap. In case it won't, increase the size of the hole with a small file. Next solder a 3-inch length of hookup wire to each pin of the miniature socket. Leave sufficient insulation on the wires so that crossing leads will not short. Insert the wires in the appropriate pins of the octal plug, and pull the wires taut. To complete the

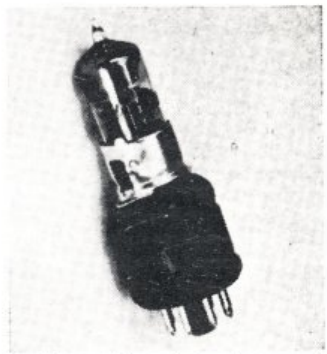


Fig. 1—A miniature-tube adapter for an octal socket.

adapter, solder the wires to the connector pins, and plug in the miniature tube. — *Hank Van Hooser, W4DIJ*

Reprinted from QST, February 1969

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TOOTHPASTE-TUBE CAP INSULATORS

Toothpaste-tube caps are an excellent source of material for constructing feedthrough and standoff insulators as illustrated in Fig. 2. The feedthrough in example *A* is made by mouting a toothpaste cap on each side of a metal plate and passing a threaded rod through both caps. A spacer of insulating material is mounted at the center of the rod to prevent accidental contact between the rod and the metal plate. The nylon wheel of a curtain runner is ideal for this purpose. In example *B*, the necessary hardware is bolted to the cap and the cap in turn glued to the plate.

A non-insulated standoff is constructed by directly bolting the toothpaste cap to the plate as illustrated in example *C*. An insulated version is made by cementing a machine screw to the concave recess in the top of the cap and gluing

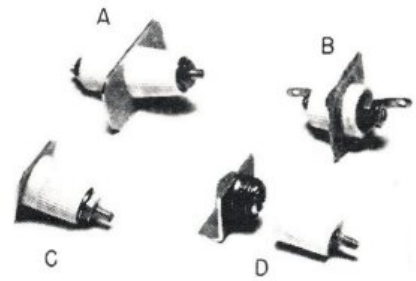


Fig. 2—Toothpaste cap feedthroughs and standoffs.

the cap to the plate. The cap can also be bolted to the plate as shown in example *D*.

Fig. 3—Feedthrough insulator made from the nylon wheels of a curtain runner.

Fig. 3 shows yet another method of constructing a feedthrough insulator. A small insulated washer, placed at the center of the assembly, prevents a short circuit between the rod and metal plate. — *D. P. Taylor, ex-G8OD*

Reprinted from QST, May, 1966 ●

Commercial Kinks

with Ron Fisher VK3OM
3 Fairview Ave., Glen Waverley, 3150

Over the period that I have been writing Commercial Kinks, several pieces of gear have stood out as top favourites by the number of enquiries received. Those that have so far been covered include several units from the Yaesu range, the Trio 9R59, plus several other popular transceivers. Apart from these, the war time AR7 receiver rates very high on the enquiry list. Thousands of these receivers must have been released through disposals sources over the last twenty five years and it seems to be a surprising thing that many of these are still in original condition. As an aid to those who are lucky enough to own one of these, over the next few months I will present a run down on the set and then a few of the more popular modifications that have been proven over the years. Because of space limitations it will not be possible to publish the full circuit diagram but these will be available from **Commercial Kinks** in the usual way.

THE AR7 PART ONE

— description and specification.

Sensitivity. The absolute sensitivity is such that a radio frequency input of one microvolt modulated to a depth of 30 per cent at 400Hz applied through a standard dummy antenna gives an output greater than 50 milliwatts in the 600 ohm line with a signal to noise ratio of 1:1 in milliwatts or better. The specifications demand a minimum sensitivity of one microvolt absolute to give an output of six milliwatts under such conditions. Actually the output is as high as two hundred milliwatts on some bands. These readings are taken with the volume control adjusted to give a signal to noise ratio of 1:1 in watts.

Power Output. With the same input as above (1 microvolt) from a signal generator or antenna, and with the volume control advanced beyond the noise ratio of 1:1, maximum undistorted output to the speaker is nearly two watts. Output to the headphone jack is about 40dB below output level depending on the type of headphones used.

Image Ratio. Two stages of radio frequency amplification are used and these provide the following image attentuation. 8MHz. 50dB. 12MHz. 40dB. 13MHz. 54dB. 19MHz. 35dB. 24MHz. 26dB.

IF Selectivity. (1) Crystal in—Attenuation at 5kHz off resonance to be better than 50dB. At 1kHz off resonance to be better than 2dB. Selectivity control at maximum. (2) Crystal out—Attenuation of at least 6dB at 3kHz off resonance.

ANTENNA INPUT. The input to the antenna coil is designed for double or single wire input and has an average input impedance of 400 ohms. If a single wire is used it should be connected to terminal A1, a jumper wire being connected from earth to terminal A2.

COILS. The frequency range of the receiver is covered in five bands. The plug-in coil units are lettered from A to E and cover as follows.

Band A	140 to 405kHz.
Band B	490 to 1430kHz.
Band C	1420kHz to 4.3MHz.
Band D	4.25MHz to 12.5MHz.
Band E	12.5MHz to 25MHz.

The electrical contacts on the coil acceptor unit are constructed of phosphor bronze silver plated and are self cleaning by friction.

Parallel trimming condensers are employed on bands A B C and D, and series capacity tuning on band E.

The main tuning of the receiver is accomplished by means of a four gang capacitor each section of which has a capacity of 11 to 240pF. The whole assembly is mounted on a ⅛ inch plate to ensure rigidity.

The oscillator coil is tuned 455kHz higher than the signal frequency and this is maintained over each band by correct adjustment of the inductance slug and padder capacitor mounted inside the coil shield. Band E has no padder or variable inductance. Correct tracking on this range is maintained by spacing the turns of the secondary winding during manufacture and adjusting C8 at the low frequency end of the band.

Crystal Filter. Continuously variable selectivity is possible by means of the front mounted control while the phasing control allows the rejection of any portion of either of the two sidebands. The rejection remains constant at any position of the selectivity control. The crystal is a special AT cut having a high Q and low drift. The resonant frequency of the crystal is 455kHz plus or minus 100Hz. The phasing capacitor is a different type, that is two capacitors in parallel with the variable plates common to both arranged in such a way that when the capacity of one section is increased, the other is decreased. This means that the total capacity remains constant and thus the resonant frequency of the associated IF transformer remains constant.

Next month full alignment procedure will be described and the following month details on how to modify the BFO to give reactance tube control for increased stability and also a Squelch circuit for use on net frequencies. ●

PROJECT AUSTRALIS

with David Hull VK3ZDH, Chairman, Project Australis.

SUMMARY OF AMSAT-OSCAR-B SPACECRAFT SYSTEM.

1. AMSAT Deutschland Repeater (designed by Karl Meinzer, DJ4ZC)
   Input freq. passband between 432.125 and 432.175MHz.
   Output frequency passband between 145.975 and 145.925MHz.
   Power output (high power mode) is 14W PEP.
   Downlink passband is inverted from uplink passband.
   Repeater is 45 per cent efficient using envelope elimination and restoration technique.
   Linear Operation — SSB and CW are preferred modes.
   Repeater is commandable to either 3.75 or 14W PEP output.
   Telemetry beacon at 145.980MHz (200mW).
2. AMSAT Two-to-Ten Meter Repeater (designed by Perry Klein K3JTE)
   Input freq. passband between 145.85 and 145.95MHz.
   Output freq. passband between 29.40 and 29.50 MHz.
   Power output is 2W PEP.
   Downlink passband is not inverted from uplink passband.
   Linear Operation — SSB and CW are preferred modes.
   Telemetry beacon at 29.50MHz (not same as OSCAR 6).
3. Morse Code Telemetry Encoder (designed by John Goode, W5CAY)
   24 analog input channels.
   Converts each analog value into a two-digit Morse code number or "word".
   A third digit precedes the telemetry value and gives the line number in which the word is located.
   Format is arranged 4 words per line, six lines per telemetry frame.
   Morse code rate is commandable to 10 w.p.m. or 20 w.p.m.
4. Teletype Telemetry Encoder (developed by Peter Hammer, VK3ZPI and Edwin Schoell, VK3BDS).
   60 analog input channels.
   Converts each analog channel to a three-digit number transmitted in Baudot code.
   Each three-digit value is preceded by its channel number, making a five-digit telemetry word.
   The data is arranged 10 words per line by six lines per telemetry frame.
   Two lines of status information follow the analog matrix and give the spacecraft time (i.e., time in "counts" from launch, 1 count = 96 minutes).
   Output keys 435.1MHz beacon in FSK: 850-Hz shift; 45.5 Baud: (reversed from U.S. standard). Also keys 145.98 and 29.50MHz beacons as AFSK, on command.
5. 435.1MHz Beacon Transmitter (developed by Larry Kayser, VE3QB and Bob Pepper, VE2AO)
   Beacon output freq. is 435.10MHz.
   Power output is 0.4W at an efficiency of 45 per cent.
   Beacon is FSK modulated 850-Hz shift.
6. 2304MHz Small Beacon Transmitter (developed by San Bernardino Microwave Society)
   0.1W at 2304MHz.
   Turned on by command only for 30-min. periods.
   CW keyed — HI followed by 30-sec. carrier. Also keyed with Morse code telemetry on command.
7. Codestore — Message store-and-forward system (built by John Goode, W5CAY)
   896 bit memory capacity using COS-MOS shift register memory.
   Loaded via command link.
   Output code speed is 13 w.p.m.
8. Experiment Control Logic (designed by Jan King, W3GEY)
   Selects the spacecraft operating modes.
   Protects satellite against excessive battery drain by reducing repeater output power or by shutting it off completely.
9. Input Solar Power-Battery Charge Regulator (developed by Karl Meinzer, DJ4ZC and Werner Haas, DJ5KQ)
   Converts 6.4V at arrays to 14V to charge battery or to supply the spacecraft experiments.
   Senses overcharge of battery and reduces charging current.
   Senses failure of either of the two redundant regulators and switches to the opposite regulator automatically.

AMSAT-OSCAR-B SPACECRAFT

A-O-B (to be known as OSCAR 7 after launch) is an international effort now involving four nations. The A-O-B systems developed in each country are as follows:

Germany:	AMSAT Deutschland Repeater, Spacecraft Structure, Battery Charge Regulator, 28V Power Regulator, Antenna System — DJ4ZC, DJ5KQ.
Australia:	Two Redundant Command Decoders, Teletype Telemetry Encoder — VK3ZPI.
Canada:	435.1MHz Beacon Transmitter — VE3QB and VE2AO.
United States:	2M-10M Repeater, Morse Code Telemetry Encoder, Experiment Control Logic, Instrumentation Switching Regulator, Solar Panels, Battery — K3JTE, W3GEY, WA4DGU, W3DTN, Marie Marr.
	Codestore — W5CAY.
	S-Band Beacon Transmitter — K6HIJ.

●

Dry batteries.

"Amateur Radio operators, especially those on 2-metre Fm, are using more and more dry batteries than ever before. Zinc-carbon batteries rate very high on the list because they are relatively inexpensive and easy to find, although some Amateurs use the more expensive but higher powered Alkaline-Manganese cell, and a few swear by rechargeable Nicads. A new dry battery, which will be on the market in the near future, just might revolutionise the whole field of portable dc power. (This is) the Lithium Organic cell which has been receiving enthusiastic reviews from the military . . . Lithium batteries are lighter, have greater power output, can operate over wide temperature ranges and have a remarkably long shelf life — up to 20 years."

('A second look' by Jim Fisk in Ham Radio, July '73).

Use or lose.

"What is the justification for allowing a group of individuals known as Radio Amateurs the exclusive use of large chunks of valuable radio spectrum space?

The FCC in the Basis and Purpose Section of the Amateur rules mentions six things. They are —

The communication service that amateurs provide for the public (especially emergency communications);
Their advancement of the radio art;
Advancing of technical skills;
Expansion of the reservoir of trained personnel;
The enhancement of international good will;
The advancing of communication skills.

Of the six, the most neglected by (amateurs) is the advancement of skills for communicating."

(Guest editorial in CQ, July '73.)

Can any other Division equal or better this?

VK6 Division now boasts two new callsigns:-

VK6ZHA and VK6ZDA — A father and son combination who both gained their calls at the same examination.

The long arm of coincidence stretches even further — both have the same "handle" — Adrian.

Just to keep the record straight, Adrian senior previously held a PA call.

Well, what about it you other Divisions?

Ross VK6DA.

IARU Region II

The 4th triennial Region II conference was held in Santiago, Chile from 9th to 13th April this year at which 9 countries were directly represented, 5 by proxy, 2 others were included in committee members without vote and also attending was Bob Denniston, WODX the IARU President. A wide range of topics were discussed including IARUMS, better band usage and a number of recommendations resulting from the Managua earthquake.

MEMBERSHIP — ARRL

Interest in Life Membership continues at a brisk pace. We are only a few away from having 2500 elected Life Members of the League, with about another 2500 paying on a quarterly basis. Handsome ceramic wall plaques will be mailed about mid-June to those fifty or so members who have been members of the League for 50 years or more and who have already received the 50-year pin.

QST June '73.

(The 1973 WIA Easter Convention directed that the question be examined of suitable recognition to members of the WIA for 50 years and over — Ed.)

COLOUR TV.

Break-In for July '73 quotes a resolution passed at this years NZART Conference as reading "That Council seeks from the NZ Post Office and NZ Standards Association an assurance that colour television sets, either manufactured locally or imported, shall conform in all respects to the standards laid down by the CCIR."

Reciprocal licensing

"G3BID informs us that in future, foreign amateurs operating temporarily in Switzerland will use their home call/HB9. Amateurs wishing to operate in HB0, Liechtenstein, should advise the Swiss Authorities at least five days in advance of their intention to operate in the Principality. They are insistent upon this since Liechtenstein is not part of Switzerland — the Swiss only deal with radio licensing for administrative convenience."

ARMS Mobile News May '73.

Mobile DX

"Ted M. Marks, WA2FQG receives our congratulations this month on getting his "140" sticker for his Mobile Century Award. His latest additions were mostly on 15m SSB." ARMS Mobile News May '73. This award is similar to DXCC but involves mobile operation contacts. By-the-way a DXCC, mobile-to-mobile, would appear to be possible although exceedingly difficult.

PRINCE PHILLIP VISITS TOWNSVILLE

Ross Melton VK4ZLC

On October 23rd H.R.H. Prince Philip visited Townsville to present the Duke of Edinburgh Awards.

The awards were presented to the recipients at Anzac Park on Townsville's Beautiful Strand. The Townsville Amateur Radio Club display shown in the photos was only one of many displays featured during the afternoon. The display included AR magazine covers, QSL cards and posters, and working models on amateur frequencies.

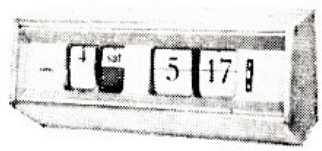
Using the FT101 Prince Philip was able to talk with the crew of the rafts of the Las Balsas expedition. The rafts were located at 170 degrees 59 minutes East, 24 degrees South when contacted. The antenna used was a TH3 JR erected on a 30 foot self supporting mast amongst the coconut palms at Anzac Park. About half a dozen Townsville amateurs spent many hours beforehand setting up the various pieces of equipment.

The display achieved its purpose in allowing Prince Philip to talk to Las Balsas as well as being a very interesting showpoint among the general public.

"He sounds like he's six feet under water", said the Duke of Edinburgh as he talked with Captain Alsar. He went on to say, *"Wish them the best of luck. Tell them I'm sorry I won't be here when they arrive."*

Power was generated on site, and provision for a standby link on 7MHz was established with Les VK4LZ at Airlie Beach. Fortunately 14MHz proved satisfactory with signals being R5 S8 during most of the afternoon.

COPAL-CASLON
24-HOUR DIGITAL ELECTRIC CLOCKS
CLEARLY VISIBLE FIGURES
INSTANT READABILITY, ACCURATE



Model 601, A.C., The Popular One

A unique desk/table calendar model, combining utility and beauty, receiving the Mainichi Industrial Design Award, Japan. Digital flip cards advance date, day, hour and minute automatically. Anodised aluminium case houses built-in neon lamp. 230v. 50 Hz. A.C. Cord and plug attached.

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New Model, BATTERY POWERED, with alarm. Tuning fork controlled.

At last, a clock that will operate anywhere and does not clutter up the room with a cord. It is accurately controlled with a tuning fork operating at 400 Hz., running from a single torch cell which has a life of approx. one year. The alarm can be set 24 hours ahead. Push-button operated globe to illuminate face. Ultra modern cylindrical case, silver finish. 3⅜ inch diam. x 8½ inch.

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295mm x 174mm x 134mm,
Colour, off-white, 230V AC 50Hz, 53mm high figures. Cord and plug attached.

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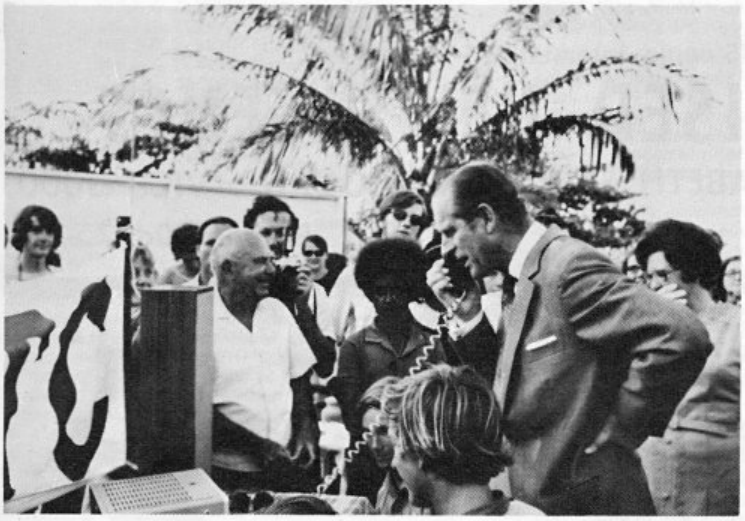
18th VK2BPN 2768 points
21st VK5BV 2586 points
31st VK3ZC 1592 points
39th VK6RV 1302 points
40th VK3KX 1295 points
41st VK2GW 1281 points
43rd VK3MR 1230 points
68th VK3RJ 380 points
72nd VK2VN 235 points

(Congratulations are offered to Ivor Stafford VK3XB on winning the "VK" silver medal, and to Ron Vaughan VK6RV on winning the bronze medal.)

ABOVE—
Len VK4GD tells the rafts that Prince Phillip has arrived to inspect the TARC display.



ABOVE—
Prince Phillip asks Las Balsas "How's the weather out there?"

Ross Inglis operating VK4QD's FT101. Ross handled the Las Balsas contact in the presence of Prince Phillip.

SCALAR

Amongst the comprehensive range of SCALAR ANTENNAS there are some of special interest to the Radio Amateur. (These include) our VHF & UHF, Citizens Band Range, HF Mobile and Base Station Units for Land & Marine applications, for example . . .

For more efficient 2-metre performance use the SCALAR M25. A 3dB gain mobile, designed for use in the 140-175 Mhz band. The antenna is a 5-8 wavelength whip complete with integral loading coil. Constructed of fibreglass these antennas combine resilience with non-ferrous continuity for high quality performance and noise free operation.

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WA: Allcom Pty. Ltd., Phone: 57 1555.
SA: Rogers Electronics. Phone: 264 3296.
QLD: Warburton Franki (Bne.) Pty. Ltd. Ph: 52 7255.

BOOKS OF INTEREST FOR AMATEUR OPERATORS

- NEWNES—**RADIO ENGINEER'S POCKET BOOK** $4.25
- SIMON—**104 HAM RADIO PROJECTS FOR NOVICE & TECHNICIAN** $4.25
- 73—**SLOW SCAN TELEVISION HANDBOOK** $5.75
- G.E.—**ELECTRONICS EXPERIMENTERS CIRCUIT MANUAL** $4.00
- R.S.G.B.—**TELEVISION INTERFERENCE MANUAL** $2.95
- AUST HI--FI—**STEREO BUYER'S GUIDE, SPEAKERS—NO. 2** ..... .60c
- SIMS—**PRINCIPLES OF PAL COLOUR TELEVISION** $3.80
- SCHULTZ—**UNDERSTANDING AND USING RADIO COMMUNICATIONS RECEIVERS** $4.25
- MIDDLETON—**TAPE RECORDER SERVICING GUIDE** $5.95
- ELEC. AUST.—**BASIC ELECTRONICS, 4th Edition** $2.00
- ELCOMA—**TRANSISTOR INTERCHANGABILITY GUIDE, 1973** $1.00
  (Japanese to "Miniwatt" types)

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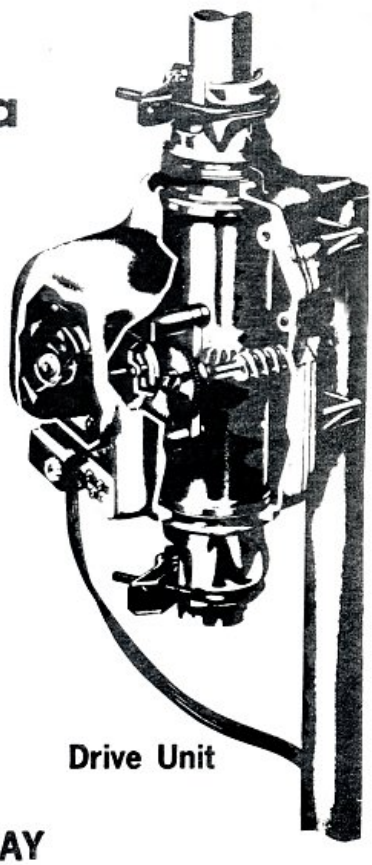
A five-core cable is available to connect rotor to control unit.



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VHF UHF
an expanding world

with Eric Jamieson VK5LP
Forreston, S.A., 5233
Times: GMT

VKO	52.160	VKOWI Macquarie Island
	53.100	VKOMA Mawson
	53.200	VKOGR Casey
VK2	52.450	VK2WI Dural
VK3	144.700	VK3RTG Vermont
VK4	52.600	VK4WI-2 Townsville
	144.400	VK4WI-1 Mt Mowbullan
VK5	53.000	VK5VF Mt Lofty
	144.800	VK5VF Mt Lofty
VK6	52.006	VK6VF (VK6RTV) Bickley
	52.900	VK6RTT Carnarvon
	144.500	VK6RTW Albany
	145.000	VK6VF (VK6RTV) Bickley
VK7	144.900	VK7RTX Devonport
VK8	52.200	VK8VF Darwin
ZL1	145.100	ZL1VHF Auckland
ZL2	145.200	ZL2VHF Wellington
	145.250	ZL2VHP Palmerston North
ZL3	145.300	ZL3VHF Christchurch
ZL4	145.400	ZL4VHF Dunedin
JA	52.500	JA1IGY Japan
	50.100)	HL9WI South Korea
HL	52.010)	
KX6	50.110	KX6HK Marshall Islands
KH6	50.104	KH6EQI Hawaii

Various other beacons and television VHF frequencies were listed last month, and these should be referred to for a complete list. From very scanty information available it appears some of the Australian beacons are not operational at the time of preparation of these notes, but are included as it would be reasonable to expect that most areas would have their beacons on the air for the VHF DX season. VK7RTX is off the air whilst a new site is found. VK4WI-2 at Townsville has also been off for some time but hopes to be back before long. The VK2WI beacon has been off for a couple of months, and unless something is resolved pretty soon in VK2 regarding the installation of the new 6 and 2 metre beacons prepared by Roger VK2ZRH, little will be heard from there. Things are a bit up in the air in VK6 as well; it appears the 2 metre beacon in Perth has not been operational for some time. I just wonder how all these various problems are to be solved and whether they can be by the time you read this. Anyway, I'll never be told direct, such news only comes on the grape-vine, months afterwards!

ROSS HULL CONTEST

Once again a reminder that the Ross Hull Memorial Contest will be with us again from 7th December to 20th January 1974. As always there will be plenty of participation, and it is to be hoped all have a very pleasant time. But do remember the poor Federal Contest Manager who wants you to send in your logs please. The contest for some time has had a very poor return of logs. Can we do better this year?

NEWS FROM NEW ZEALAND

Stan, ZL4MB, in Dunedin, has written to fill VK in on the present state of the art in ZL4. Stan is hoping for a better DX season this year. Commenting on last year, he mentions conditions were dead over Christmas and New Year. Best day was 11th February when he worked VK1JC-VK1ZPB at mid-day, VK5ZWW at 1320 and VK3ZGP at 1643.

Hugh, ZL2AID has improved his gear for this season; now VFO control and 150W PEP SSB as well as a unit for his car. Paul, ZL1QI is up to 30 watts PEP. Brian ZL1AVZ, Bill ZL3QK, Max ZL3AAN are all expected to be operational.

Stan advises he will be home for lunch practically every day and will be listening 1215 to 1250 EDST each week day from 1st December, with either 100 watts AM or 100 watts DSB available. He has built new converters, tuneable IF strip with Collins mechanical filter. Stan will also be resuming his Sunday morning calls from 1-12-73, calling on the hour from 0800 to 1300 EDST, mostly operating on 52.000 MHz.

For those with 80 metre facilities, Stan mentions the continuing Thursday night sked with Geoff VK3AMK on 3643kHz at 2000, and fairly regular visitors have been David VK3ANP and Mike VK2AM.

STATE OF THE ART CONTEST

The VHF contest arranged by 6UP Magazine in Sydney, under the auspices of Rod VK2ZQJ as Contest Manager, resulted in a win for our stalwart VK5 kiwi, Wally VK5ZWW, who scored 31095 points from 46 contacts, all on 52 MHz, being meteor and other type scatter contacts, all from around 0530 EST, and embracing 20 such mornings of activity. The only mornings Wally did not appear in the log were 25th July and the 2nd August. That's a pretty good effort Wally, and the VHF fraternity offers their congratulations to you. Second place to Allan VK3TV with 23738 points and 90 contacts.

The best distances covered by this mid-winter contest were: 52MHz; Wally VK5ZWW to Barry VK2-ZAY 763 miles; 144MHz: David VK3ANP to Mike VK3ASQ 190 miles; Geoff VK3AMK to VK3BEH 188 miles; Allan VK3TV-Stephan VK3ZAZ to Chris VK5MC 185 miles. 432MHz: Byron VK3YFL to Les VK3ZBJ 80 miles. 1296MHz: David VK3AUU to Les VK3ZBJ 30 miles. David used 0.2 watts on 1296.

Thanks to 6UP magazine for the above information, and for advice that there will be a similar such contest in 1974, dates to be decided when the 1974 IGY calendar is available for M-S data.

1296MHz.

Thanks to the Victorian VHFer for the following, headed **500 Watts DC Input.**

> *Perfectly legitimate . . . but, you must have a special permit to make use of all these electrons.*
>
> *This is the factual situation at the QTH of Ron, VK3AKC, in Geelong who has already done a mountain of experimenting on 1296MHz, and much valuable work on all the VHF bands.*
>
> *The recently acquired high power permit by Ron must be renewed every 12 months and can only be used for EME experiments under the supervision of the PMG Department . . . the dish reflector must be no less than 10 degrees of elevation and this calls for a very high standard of workmanship to maintain the mechanical stability necessary under all types of weather conditions . . . the 20 foot diameter dish was entirely constructed by Ron in conjunction with commendable aid from his wife on computations for the project.*
>
> *Besides numerous verifications via EME Ron's recent endeavours procured for him confirmation from NRL (Naval Research Laboratory, USA) — in the form of a tape, and QSL card, of his contact during their 50th Anniversary Contest, also a very nice Certificate for his efforts.*
>
> *Getting your feet wet at 1296MHz tropospheric-wise is not so difficult these days with the abundance of solid state devices available, but inter-continental contacts via Moonbounce can only be described as an undaunted dedicated effort . . . to those engaged in this field of amateur activities must go the rich rewards in human satisfaction.*

Good work Ron.

VK5ZWW to OSCAR 6.

Wally, VK5ZWW, has taken time off from working M-S to write me a short note, and I need only quote:

> *With my transmissions through Oscar 6, so far I have worked ZL's 2, 3 and 4, VK's 2, 3, 5, 6 and 7. The transmitter has a 3-12 in the final with a measured output of 3 watts PEP into a ¼ wave whip mounted on the shack roof. On the receiving side I use an unmodified Drake 2B and a half wave dipole.*
>
> *Have heard many other signals including the exotic ones from the equator but am afraid the QRP is not good enough. Because of this QRP the satellite is only available for a period of about 5 minutes at the centre of a 20 minute pass.*
>
> *Hope to be running RTTY through Oscar and also RTTY is available on 52MHz already.*

Thanks for the news Wally, please write again.

2m in G-Land

It seems to us that the 2m band is becoming far too mode conscious, with SSB operators who only ever work SSB stations, FM-ers who only ever listen on their own channel and AM and FM stations who cannot receive SSB anyway. (G3FPK in Mobile News Sep. '73 editorial).

It bothers me that the two metre band seems to be degenerating into just a few fixed channels, i.e. SSB, FM talk box channels and now repeaters. It seems that if we are not careful the 2MHz wide band which we now have will be taken from us and we will be allowed only certain fixed channels. (G8CZM-M writing in the same issue).

French Transponders

"Anjou" and "Mirabel" 70cm uplink 2m downlink transpanders are part of balloon experiments being carried out in France. The packages are built for 60,000 to 80,000 feet, stay there about 2 hours and fall under parachute. During recent flights contacts through the transponders were made by G to OE and F to OH. The *Mobile News* (Sep. '73) article ended "After all it's like using a repeater on a 15 mile high tower."

GENERAL NEWS

. . . A new beacon in Kalgoorlie, with the call sign VK6RTU, is awaiting a licence from the PMG, and plans to run about 40 watts FSK . . . Ray VK3ATN now using 56 elements on 144MHz with successful contacts to VK2SW in Wagga . . . On a Sunday morning recently a rare sight was witnessed when a 35 foot steel tower was transported from Port Sorell to East Devonport on top of a Holden Station Sedan! Not content with that the tower was lifted over the top of the house and now rests in the back yard of Graham VK7ZAQ. (From QRM, Launceston.) . . . VK4TC, the Townsville Amateur Radio Club station should have a 6 metre base station soon — a transceiver donated by Rod VK4ZRC is being converted by Bob VK4ZRG (Backscatter, Townsville.) . . . VK9CZ on Willis Island will be carrying out ATV skeds before long on 432MHz . . . During a recent visit to VK6 Rod Graham VK2ZQJ visited Don VK6HK, who is one of the three southern hemisphere control stations for Oscar 6. Rod reports the teleprinter for Oscar 7 was already installed. The antenna system at 6HK is steerable from the shack in azimuth and elevation. The 144MHz aerial was 2 bays of 10 element crossed yagis and it was possible to shack select in real time vertical, horizontal, RH circular or LH circular polarization. The 432 array (for the now defunct 435.1MHz beacon) had many elements but was so high up it was not possible to count them. Assorted antennaes for 29.5MHz and other HF bands, and something like 16 coaxial cables coming into the shack from the antenna installation. The transmitter ran a pair of 4CX350's (6 UP, October).

That will have to do for this time. Hope to see or hear all my friends on VHF this DX session: I will be running SSB on both 6 and 2 metres. **AND PLEASE SEND IN YOUR ROSS HULL LOG THIS YEAR!** Closing with the thought for the month: "Most families do not worry about the wolf at the door any more. They just feed him on instalments."

The Voice in the Hills. ●

Key Section
with Deane Blackman VK3TX

Box 382, Clayton, Vic., 3168

My apologies to regular readers of this column for its absence over the past few months. It is much easier to write when I get on the air and "talk" to people, but I am sure some beside me find that work keeps getting in the way of Amateur Radio.

Tom Clarkson, ZL2AZ, drew my attention to an article he wrote in April 73 *"Break In"* discussing the refusal of CW to lie down and die in the face of phone activity. As you might expect from the man who represented you at the recent ITU Conference it has a good deal of sound stuff in it.

The President's Cup has come back from the jewellers looking very fine and shiny. The winner will be known when the results of the VK-ZL become available; the formula was published in *AR* in August 1972. The formula includes a strong contribution from the results of the Ross Hull VHF contest, which begins this month. The Key Section had the CW part of this contest restored; can I again encourage you to support the Ross Hull? You thereby support CW, and the field, in 1972-3 anyway, was pretty small.

This month also brings the festive season, and the thoughts of summer holidays. Let me wish you the compliments appropriate for the 25th, and remind you not to forget to pack your key when you go away. ●

Contests

with Peter Brown VK4PJ

Federal Contests Manager, G.P.O. Box, 638 Brisbane, Qld., 4001.

Notes on the John Moyle Memorial National Field Day rules.

There is a separate section this year for VHF operators, brought about by the interest in last year's RD Contest.

Entrants in sections (a), (b), (c), and (d), of course can operate VHF but obviously cannot enter section (e).

You will note that Portable Field Stations may make a second contact with another Portable Field Station after a lapse of 4 hours while the now accepted rule for VHF operators, of repeat contacts after 2 hours, stands.

If there are sufficient entries in section (d), multiple operation, I will separate entries into phone and open, and there will probably be sufficient entries. The rules could have contained this I suppose but don't you think they are complicated enough??

Similarly for section (e) with Portable Field Stations and Mobiles. We did not do so well with the ZLs last year and I do not know their Field Day dates this year. I have airmailed Jock ZL2GX, NZART Contest Manager, and hope to advise you next month. If there are good openings we will help each other a lot.

Note that CW-CW contacts count double.

Fixed Home Stations. What about giving the blokes out in the field something to talk about? Make them feel that their effort getting out in the field is worthwhile. When you come home on Saturday night after the show (or a party?) get on the air and look for a field station or two . . . before breakfast will do . . . or before lunch.

CONTEST CALENDAR.

December 7th and 9th ARRL 160 CW Contest.
December 15th & 16th ARRL New 10 metre Contest.
December 22nd & 23rd Hungarian Contest.

Ross Hull Memorial VHF-UHF Contest is on **NOW!** Rules in October *"AR"*.

John Moyle Memorial National Field Day, February 9th and 10th, 1974.

Central Coast Amateur Radio Club Field Day, February 24th, 1974.

ARRL International DX competition.

Phone, 1st full weekends in February and March.

CW, 3rd full weekends in February and March.

ARRL New 10 Metre Contest.

From 1200 GMT Dec 15th 1973 to 2359 GMT Dec 16th 1973. No limitation. Single transmitter only. Single or Multiop.

USA & Canada transmit signal report and state or province.

Others transmit signal report and serial number beginning with 001.

One contact on phone — phone and one contact CW-CW. Anywhere.

Oscar 6 contacts count. Cross mode does not count. CW on 28.0-28.5MHz. 2 points for 2 way exchange. 4 points for W or K novice contact. Multiplier consists of the number of different states, Canadian call areas, VE1-8, VO, ITU regions and countries as ARRL list. Final score - QSO points X multiplier.

Entries to be postmarked no later than Jan 21st 1974.

REMEMBRANCE DAY CONTEST.

As well as the entrants listed last month, quite a few others also helped make the contest such a success, namely VKs 7MR, 3IC, 3AZQ, 3BMD, 3ARS, 3ANE, 9DJ, 3AH, and Aquinas Radio Club.

VK9DJ made a great effort with 2139 points and 677 contacts.

VK3AH prepared VK9ZC's Willis Island log.

You will be interested to know that Doug VK7AZ who scored 1521 points with 631 contacts is a blind op, looked after for the contest by Andrew VK7AW.

Evie VK4EQ seems to be the most successful of quite a few YL and XYL ops we are pleased to have with us.

I have a few more interesting items on the RD for next month.

Book yourself in for next year's RD and help make it a most successfull FRIENDLY contest.

ROSS HULL MEMORIAL VHF-UHF CONTEST.

How many contacts have you made so far????

Do not put off getting into the contest because time flies. AND get a log returned, be it ever so small. 200 entrants last year, and we should get a percentage increase this year, what about 200 logs???

IT'S TRUE. If you enter the contest it will be a success.

THE NEW 10 METRE CONTEST.

A few years ago 10 metres was my favourite band but apart from JAs it is not so good these days. However there is a contest in December. What about a few calls at optimum times, refer Bruce's prediction column, to find who is about??? Just listening is not enough. Who knows, you may become part of a contest.

VK-ZL CONTEST

I spent most of the time I had available in the phone section on 10 and 15 metres, and although I did not hear many VK-ZLs directly there seemed to be quite some activity. VK9s were having a ball on 15 metre with one op logging over 500 contacts.

From reports CW section went OK.

Reports tip a very successful contest. I wonder which state will do best VK4's annual convention was held that weekend. Don't forget that logs go to Perth this year.

CQ WW DX Contest.

As usual there was plenty of activity over this week end. 15 and 20 metres seemed to be open most of the time. Contestants were at it hammer and tongs when I tried for a few minutes before going to work on Monday morning.

There seemed to be plenty of VK-ZL activity.

This must be about the most popular contest of all.

If we could work up to about 400 participants from VK-ZL then our international contest may start to rival the CQ contest.

3.5MHz YU-DX Contest 1974. CW only.

2100 GMT Saturday, 12th Jan to Sunday 13th (2100 GMT.) Send SAE for details.

VHF-UHF Contests.

To my knowledge nothing developed from the suggestion that we have contests early in December. However Brisbane VHF Group have organised a contest for the 2nd December. By the time you read this it will be history but think about VHF contests in all states at the same time, say 1st week in December. ●

John Moyle memorial national field day contest 1974

Amateur Operators and Short Wave Listeners are invited to help make this contest, held in memory of the late John Moyle, a huge success.

Contestants may participate either as individuals or as part of a group. There are two Divisions (parts) in this contest. 1—24 hour continuous operation Division and 2—6 hour continuous operation Division, to be carried out within the 26 hours available.

Dates and Times.

From 0600 GMT, February 9, 1974 to 0800 GMT, February 10, 1974.

Objects.

The operators of Portable Field stations or Mobile stations within VK call areas will endeavour to contact other Portable, Mobile or Fixed stations in VK, ZL and foreign call areas, on all bands.

Rules.

1—In each Division, 24 hour or 6 hour, the operating period must be continuous.

2—In each Division there are 7 sections.
(a) Portable Field station, transmitting, phone.
(b) Portable Field station, transmitting, CW.
(c) Portable Field station, transmitting, open.
(d) Portable Field station, transmitting, open, multiple operation.
(e) VHF Portable Field station or Mobile station, transmitting.
(f) "Home" transmitting stations.
(g) Receiving portable and mobile stations.

3—Contestants must operate within the terms of their licence.

4—A Portable Field station must operate from a power supply which is independent of a vehicle or permanent installation.

5—No apparatus may be set up on site within 24 hours of the contest.

6—All amateur bands may be used but cross band operation is not permitted.

7—Cross mode is permitted.

8—All operators of a multi-operator station must be located within an approximate half mile diameter circle (800 metres).

9—Each multi-op transmitter should maintain a separate log.

10—All multi-op stations logs should be submitted under the one call-sign.

11—One only multi-op transmitter may operate on a band at a time.

12—RS or RST reports should be followed by serial numbers beginning 001 etc.

13—**Scoring. For Portable Field stations and mobiles.**

Portable Field Stations and mobiles, outside entrants call area . . . 15 points.

Portable Field stations and mobiles, inside entrants call area . . . 10 points.

"Home" stations outside the entrants call area . . . 5 points.

"Home" stations within the entrants call area . . . 2 points.

For "HOME" stations

Portable Field stations outside entrants call area . . 15 points.

Portable Field stations within entrants call area . . . 10 points.

14—Portable Field stations may contact any other Portable Field station twice on each band during the period of the contest provided that four hours elapse after the previous contact with that station on that band.

15—VHF Portable-mobile Field stations may contact any other VHF Portable-mobile Field station repeatedly provided that two hours elapse after the previous contact on that band.

16—Operation via active repeaters or translators is not acceptable for scoring.

17—All logs shall be set out under headings of Date-time, in GMT, Band, Emission, Callsign, RS-T sent, RS-T received, Points claimed.

List contacts in correct sequence. There MUST be a front sheet to show . . . Name, Address, Division, Section, Callsign. Callsigns of other operators . . . Location, Points Claimed. Equipment used, Power supply. I herewith certify that I have operated in accordance with the rules and spirit of the contest . . .

18—Certificates will be awarded to the highest score of each section of the 6 hour and 24 hour Divisions. The 6 hour certificate cannot be won by a 24 hour entrant.
Additional certificates will be awarded for excellent performance.

19—Entrants in sections (a), (b), (c), (d), and (e) must state how power for transmitting is derived.

20—All CW-CW contacts count double.

21—Entries must be forwarded in time to be opened on 22nd March, 1974. Clearly mark your envelope that it is a John Moyle Memorial National Field Day entry and address to Federal Contest Manager WIA, Box 638, GPO Brisbane, 4001.

I like to hear that you enjoyed the contest and your suggestions may add weight to like suggestions from others.

Please read my notes on the rules, that follow.

RECEIVING SECTION.

This section is open to all Short Wave Listeners in VK Call areas. Rules, as applicable, are as the transmitting station rules but logs do not have to show report and serial number of the second station or station called.

Logs must show the call sign of the portable or mobile station heard, and report the serial number sent by that station, and the call sign of the station called.

Scoring will be as transmitting stations score. A station calling CQ does not count. Portable-Mobile stations, which must be listed in the left hand call-sign column, alone count for scoring. Stations in the right hand column may be any station contacted.

A certificate will be awarded to the highest scorer of each of the 6 hour and 24 hour Divisions, individual multiple operator entries. Certificates will be awarded for excellent performance. Note rule 21. ●

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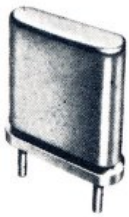

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AMATEUR OPERATORS' CERTIFICATES OF PROFICIENCY
Examination, Section M (Theory), August, 1973.

(Time allowed — 2½ hours)

NOTE: — **SEVEN questions only** to be attempted. Credit will not be given for more than **SEVEN answers. All questions carry equal marks.**

1. In relation to the final class C radio-frequency power-amplifier stage of a transmitter:
   (i) explain why the anode current varies as the tank circuit is brought into resonance; and
   (ii) state whether the anode current will vary when a resonant aerial is coupled to the tank circuit. Explain.

2. Assisted by a circuit diagram, describe the operation of a mains operated power supply which uses silicon diodes. The power supply is required to provide a regulated output of 6 volts to supply a crystal oscillator and an unregulated output of 9 volts for the buffer stage of a transistor type transmitter.

3. With reference to single-sideband suppressed-carrier transmission and reception discuss the functions of the following:
   (i) the balanced modulator;
   (ii) the product detector; and
   (iii) the final class B linear R.F. amplifier.

4. (a) Describe the process by which high-frequency radio waves may be propogated over long distances and explain why frequency changes may be necessary to maintain continuous service over a long distance communication path, e.g. — Australia to England.
   (b) Discuss the effects of the eleven year sunspot cycle on the use of frequency bands allocated to the amateur service.

5. With the assistance of a circuit diagram, describe the operation of a device suitable for measuring the ratio of forward to reverse power present in a transmission line feeding radio-frequency to an antenna.

6. (a) Aided by a sketch,describe the construction and principle of operation of a moving-coil (dynamic) type of microphone.
   (b) Discuss the relative merits and demerits of a moving-coil and carbon type of microphone as regards fidelity and sensitivity.

7. (a) Define the terms:
   (i) parasitic oscillation;
   (ii) harmonic radiation; and
   (iii) self oscillation.
   (b) Indicate, two possible causes of parasitic oscillation in a transmitter.
   (c) Describe how you would locate and suppress such a condition.

8. With the assistance of a sketch showing approximate dimensions and component values, explain the theory of operation of an antenna which uses "traps" to enable it to be used for multiband operation within the amateur bands.

9. (a) Explain the meaning of the term "resonance";
   (b) Indicate how the impedance of a series resonant circuit changes as the applied A.C. voltage is varied in frequency;
   (c) Calculate the resonant frequency of an inductor of 30 microhenries and a capacitor of 120 picofarads. ●

Ionospheric Predictions

with Bruce Bathols, VK3ASE December 1973.

This information is obtained from data supplied by the Ionospheric Prediction Service Division of the Bureau of Meteorology.
Times stated as G.M.T.

28MHz — (Propagation predicted possible for approx. 40 per cent of the month).

East Coast to	
SU	0500-0900
KH6	2000-0800
G (S.P.)	0800-1000
VE3 (S.P.)	2100-2200
UA	0500-1000
W1	2100-2200
VK9	2100-1000
W6	2100-0100
JA	2200-0800
VK6 to	
SU	0400-1300
KH6	0300-0700
G (S.P.)	0800-1300
UA	0500-0700
JA	0100-0700

21MHz

VK2 to	
SU	0500-1100
ZS	0700-1100
G (S.P.)	0800-1100
VE3 (S.P.)	1500, 2000-2300
UA	0500-1100
W6	2000-0200
VK6 to	
SU	0500-1400
ZS	0600-1300
G (S.P.)	0800-1400
VE3 (S.P.)	1600
UA	0500-1200
W6	2300-0200

14MHz

East Coast to	
ZL	2400-2400
SU	0900-2400
KH6	0400-1300, 1800-2100
ZS	1200-1600, 2000-2200
G (S.P.)	0700-1600
G (L.P.)	0900-1400
VK0	1900-1400
VE3 (S.P.)	1400-2100
VE3 (L.P.)	1400-1700, 2000-2200
UA	0600-1400
W1	1300-2000
VK9	2400-2400
PY	2400-0400, 1000
W6	1600-2100
JA	0500-1200, 2100-2300
9G1 (S.P.)	1400-2400
9G1 (L.P.)	0400, 0700-2100
VK6 to	
SU	1000-2400
ZS	0200-0300, 1200-2300
G (S.P.)	0900-1700
G (L.P.)	0900-1600
VE3 (S.P.)	1400-2400
VE3 (L.P.)	1100, 2200-2400
UA	0800-1500
W6	1600-2200

7MHz

VK2 to	
SU	1400-2000
ZS	1700-1900
G (S.P.)	1300-2000
G (L.P.)	0900
VE3 (S.P.)	0800-1400
UA	1100-2000
W6	0800-1600
VK6 to	
SU	1400-2200
ZS	1600-2200
G (S.P.)	1400-2200
VE3 (S.P.)	1000-1500
UA	1200-2200
W6	1000-1600

Sunspot Numbers Predictions —
December 29, January 28, February 27, March 26.
— Mean for September '73 — 60.8
— Smoothed mean for March '73 — 43.6
— Swiss Federal Observatory, Zurich. ●

Hamads

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MR3A Carphone, ex. cond. spare set valves incl. 2 finals ch. A.B.C., **$40.** 3" **Oscilliscope** July 63, EA. **$20. 52MHz** conv., Mar. 63 EA. **$2.00.** Tony, VK2ZKA Ph. (02) 663-7336.

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AT20 Base Station TX made by STC for RAAF. 2 units mounted vert. 6 ft. or horiz, 4 stages on slide-out racks, modified for amateur use and passed by PMG. Freqs 80/40/20. Complete working order, instruction manual. **$30.00**
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Realistic DX150A Solid State Communications RX, perfect condition, selectivity & sensitivity excellent, perfect for the SWL. **$180.00** ONO.
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Signal Generator VHF 30 to 200MHz with calibrated output attenuator to one microvolt or less. Eric Gray VK3ZSB. QTHR. Bus.: (03) 630-5656.
AH (03) 25-3249.

Cathode Ray Tube type; 4EP1, 4EP31, DH10-94 or DN10-78 or any other equivalent of these.
D. Perry, 47 Trigg Street, Blair Athol, S.A., 5089.
Ph.: (08) 62-5305.

Receiver 6-9MHz command or similar RX for use as tunable IF. Need not be complete—Basics will do. VK3ZDG. QTHR. Ph.: (03) 877-3523.

Silent Keys

H. Pearson—VK2BPR

It is with deep regret that we record the passing of Harry Pearson, VK2BPR.

Although Harry only had his licence for just on twelve months, he enjoyed immensely participating in the Amateur Service, particularly on CW, and was an active Operator on the regular N.S.W. South West Zone Monday night net. In the short time he was on the air he often took part in the Sunday CW net, achieved a *"Hunter's Club Certificate"* from the I.R.S., became a member of the *"Key Club"* (Certificate No. 49), was participating in the *"Commonwealth Electorates Award"*, planned to take part in the *"Jamboree on the Air"*, a first ever for Khancoban based Boy Scouts, and recently attended the South West Zone Convention at Illabo, N.S.W.

Although Harry was known to many only as an active Amateur, few were aware that he also held the onerous position of Regional Engineer in charge of the Operations and Maintenance of the giant 1,500 Megawatt Snowy-Murray complex of the Snowy Mountains Hydro-Electric Scheme.

Harry passed away suddenly after a heart attack at his QTH on Monday, October 8 1973, and to his wife and family we extend our deepest sympathy. He will be missed by many Amateurs, both far and near.

John G. O'Brien.

W. J. Zech VK2ACP

It is with deep sorrow that we record the passing of one of our older hams William J. Zech. VK2ACP.

Bill passed away on the 8th of August 1973 at Katoomba after a short illness, aged 80.

Bill was first licensed in 1912 with the call XABQ. He moved to Victoria for some time and was issued with VK3WZ, after having VK2WZ when the VK calls were started. He later moved back to VK2 and held VK2ACP until his death.

Bill's early activities are a little vague, but it was known that he was a marine operator for some years. He was secretary of the Leichhardt and District Radio Club in 1924. Although quite active throughout his life he became almost blind in later years and found it almost impossible to use his AT21 transmitter. He moved to a nursing home and a Heathkit on 20 Mtrs until his death.

Bill had many friends with whom he corresponded, on and off the air. He was known to many Harmonics as "Uncle Bill", never failing to send a card for a Birthday or Christmas. He will be sadly missed by many who owe their start in amateur radio to him

With much regret we say 73 Bill.

Dan Clift VK2DC.

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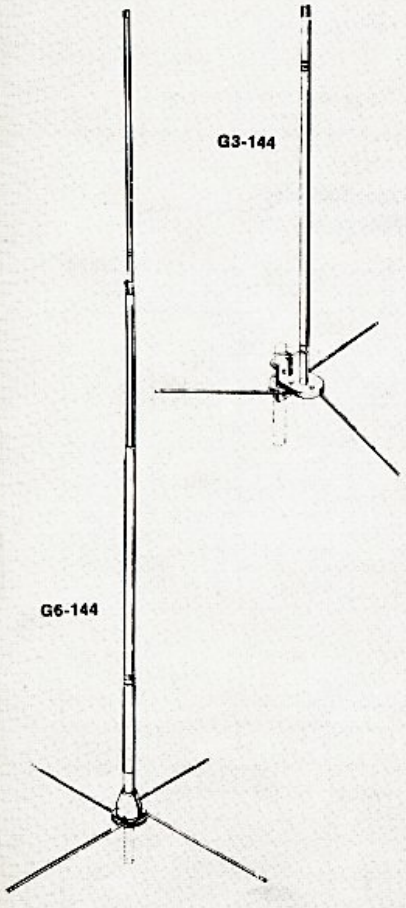
Our first limited shipment is due in from US about the time this advert appears. Hustler have a great reputation for fixed and mobile antennas. Check your band and send now, they won't last.
All prices plus road freight $2.50.

THE G6-144 A 2-METRE COLINEAR WITH 6dB GAIN. Omnidirectional with extremely low angle of radiation achieved by optimum phasing of ¾ wave and ½ wave radiators. 50 ohm. Conservatively rated at 6dB over a ¼ wave ground plane though on air tests indicate gains of 9dB at 20 miles or more. Resonant SWR of 1.1:1.6MHz bandwidth for 1.5:1 or better SWR. Rated at 250W FM. Aluminium throughout with a wind loading of only 23 lbs at 100 mph. What more do you need to know but the price **$69.00**



TYPE G3-144 IS A 5/8th WAVELENGTH WITH 3.4dB GAIN. Has an enclosed non-radiating matching system and ¼ wave radials for complete feedline decoupling assuring all signal radiation from the desired vertical element. 50 ohm feed impedance, has a resonant SWR of 1.15:1 or better and 6MHz bandwidth for 2:1 or better SWR. Rated at 200W. Supplied ready to mount for only **$29.00.**

TYPE CG-144 2-METRE COLINEAR WITH 5.2dB GAIN. Optimised gain from this super mobile antenna. Supplied in resonant length, similar specification to the G6-144 but rated at 200W, 76" tall, use the ball mount below (not supplied). Stainless steel elements to minimise wind loading. **$37.00.**

BBL-420 FOR 420-450MHz MOBILE USE. Mounts on any flat surface. Two half wave colinear giving 5.2dB gain with SWR of 1.5:1 or better. Measures 31" and handles up to 200W. **$37.00**

QD-1 QUICK DISCONNECTOR. Essential if you keep car in a garage or go under very low bridges, etc. Enables antenna to be removed and replaced rapidly with minimum of fuss **$15.90.** (p&p 75c)

C32 CHROME BALL MOUNT 180° adjustable swivel ball complete with rubber pad, steel back-up plate, hardware—even a wrench. Only **$6.00.** (p&p 75c)

WHILE WE'RE ON THE SUBJECT WE STOCK A COMPREHENSIVE RANGE OF SCALAR ANTENNAS (All p&p 75c).

M60 6-metre ¼ wave fibreglass **$10.35**
M22 2-metre ¼ wave fibreglass **$6.75**
M21 2-metre ¼ wave stainless steel **$6.27**
M25 Special 3dB gain with integral base load coil for 144-175MHz **$13.80**

M27R 27MHz centre loaded mobile antenna....**$15.53**

MK Knockdown adaptor **$6.56**

MS Spring adaptor, chromed **$4.37**

MG8 The very popular Magnabase gives instant fitting on any flat metallic surface. No holes to drill it stays on by magnets. **$27.60**

Just arrived (12/10/73)

ADVANCE ELECTRONIC CALCULATOR featuring 6 digit LED display with switch to give 12 digit in and out. Does mixed calculations, chain multiplies/divides. Selectable decimal point, zero suppression overflow indicator, etc. Uses 9V transistor battery. Try one on our 7-day money back guarantee (also fully Australian guaranteed for 90 days) but don't delay. At **$59** you can't afford not to.

MURATA CERAMIC FILTERS FOR IF USE (full data in our catalogue p&p 30c).

SFD455B features two resonators coupled by external capacitor. Typical selectivity 20dB min at plus or minus 10kHz with 3dB bandwidth of plus or minus 4.5kHz. 85c each.

SFB455A replaces transistor radio IF's 3dB bandwidth of 10kHz plus or minus 3kHz with maximum insertion loss of 5dB. 60c each.

BFB455A improves selectivity by replacing emitter bypass capacitors in IF stages simplifies alignment. 50c each.

YFL455A is an IF filter giving selectivity 19dB down at plus or minus 10kHz with 3dB bandwidth of 5.5 kHz min **$2.25** each

F29 slugs for 10MHz to 300MHz 12c each.

6146B (YL1370)) tubes in stock again at **$6.90.** (p&p 50c)).

KITS
No space for detailed descriptions, refer to magazines.

D.V.M. (E.A. October '73) complete with case **$145.**

VHF converter (E.A. August '73) components only, no metalwork **$21.50.**

6 Metre converter (E.A. August '72) excluding crystal **$14.50**

BFO (E.A. Aug. '73) very simple way to pick up SSB. **$6.35.**

30 Watt R.F. Amp kit has proved fantastically popular thanks to the tough Solid State Scientific transistors. Gives 30 Watts from 300mW on a 12.6 V supply. Save $5 on the whole kit at **$37.50** or see earlier ads for individual stages, transistors, boards etc., (full specs in our new catalogue).

ONLY READ AMATEUR RADIO?

Then you probably missed our new 64 page catalogue which was given away in the October E.A. Not to worry we can supply you with a copy for FREE. Here's what you get: Over 20 pages of pure information—including a page of useful stuff on amateur activities, data on RF transistors, popular IC's, transistors, speaker cabinet, formulae, symbols, suggested circuits. PLUS 50 cent discount vouchers. PLUS new simple mail order form. The catalogue normally sells at 50 cents and it's worth that just for the information on all the products (full specs where possible). We'll let you have a copy for just the p&p—only 30 cents. Please use the coupon or mention Amateur Radio when writing as this is a special offer. Incidentally we must apologise for the rather small print. It would have taken over 200 pages if printed normal size which we couldn't afford. If you have a magnifying glass you'll find it's easy to read!

Dick please send me a copy of your new 64-page catalogue. I enclose 30 cents towards post and packing.

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DSE

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DECEMBER, 1973
VOL. 41, No. 12

ZEPHYR PRODUCTS PTY. LTD., 70 BATESFORD ROAD, CHADSTONE, VIC., 3148. Phone 56-7231

C.G.S

TYPE C MINIATURE VITREOUS ENAMELLED POWER WIREWOUND RESISTORS

Approved to BS 9114 – N002 style 2E–56

SPECIFICATIONS

The 'C' Series of miniature wirewound, vitreous enamelled resistors has been designed to meet the requirements of Specification BS 9114 - N002, and full Qualification Approval has been granted. A Test Report Summary is available on request; this report shows that many of the performance levels are in fact much higher than the specification acceptance levels.

The use of specially selected materials, combined with the application of exacting quality control throughout all stages of production ensures the consistent achievement of a very high standard of reliability.

ELECTRICAL SPECIFICATION

Tolerance: ±5% is standard on values of 1Ω and above and ±10% between 0.1Ω and 1.0Ω. For non standard values and tolerances please consult the factory.

Resistance values: C Series resistors are available with the preferred ohmic values of the E24 Series within the ranges shown in Table 1.

Temperature coefficient: Typically less than 100 ppm/°C and never exceeding 200 ppm/°C over the category temperature range −55°C to +200°C

MATERIALS

Core: High purity steatite ceramic. Chemically inert, capable of withstanding severe thermal shock and impervious to moisture. Ground to close tolerance finish to give maximum contact with wire element for rapid heat transfer.

Resistance Element: High quality nickel-chrome or nickel-copper alloy depending on resistance value; wound at minimum tension.

End Caps: Formed to close tolerances from a special nickel-iron alloy chosen for its consistent welding properties and glass sealing characteristics.

Leads: Solder coated nickel A.

Uncoated leads can be supplied for welding.

Specify – 'weldable leads'.

Preformed and cropped leads can also be supplied on request.

Coating: Humidity proof vitreous enamel with carefully controlled expansion matched to the materials of the resistor.

TABLE 1

C.G.S.				BS 9114 - N002							STYLE CROSS REFERENCE		
Style	Maximum wattage rating @ 20°C	Resistance Range Ω		BS 9114 - N002 Style	Maximum wattage rating @ 70°C	Approved Resistance Range Ω		Critical Resistance Ω	Limiting Element Voltage. Volts		DEF. 5111-1 Style	DEF 5115-2 Style	G.P.O. Style
		min.	max.			min.	max.		Normal	Low Air Pressure			
C3A	3	0.1	10K	2E-56-2.5	2.5	1	4.7K	3.9K	100	70	RWV3J	RFH3-2.5	P.O.35
C7	7	0.1	27K	2E-56-6	6	1	15K	6.8K	200	140	RWV4J	RFH3-6	P.O.40
C10	10	0.1	68K	2E-56-9	9	1	68K	27K	500	350	RWV4K	RFH3-9	P.O.36
C14	14	0.2	120K	2E-56-12	12	1	100K	47K	750	530	RWV4L	RFH3-12	–

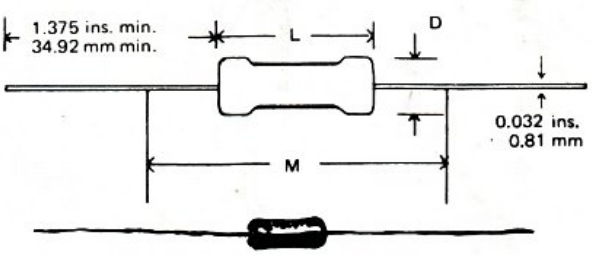

TABLE 2

Style	Length L		Diam. D		Measuring Distance M		Approx. Weight
	max. in.	max. mm.	max. in.	max. mm.	±0.062 in.	±1.59 mm.	grammes
C3A	.499	12.7	0.220	5.6	1.250	31.8	1.0
C7	.874	22.2	0.315	8.0	1.625	41.3	2.0
C10	1.499	38.1	0.315	8.0	2.250	57.2	3.5
C14	2.106	53.5	0.315	8.0	2.875	73.0	5.0

Note: M = resistance measuring points distance – below 10Ω only.